



**Information Technology Proficiency of Undergraduates  
in Higher Education Institutes in Sri Lanka**

**The Final Report for  
Consultancy on Conducting a Test for Information  
Technology Proficiency of Students**

**Client : MoHE, IRQUE Project (Credit No: 3781 CE. IRQUE –C- 07)**

**University of Colombo School of Computing (UCSC)**

**July 2009**

# **Information Technology Proficiency of Undergraduates in Higher Education Institutes in Sri Lanka**

## **The Final Report for**

**Consultancy on Conducting a Test for Information Technology Proficiency  
of Students**

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## **Table of Content**

Preface and Acknowledgement

### **1. Executive Summary**

### **2. Introduction**

- 2.1 Background - IRQUE QEF
- 2.2 Requirement and Objectives of IT Skill Assessment
- 2.3 University of Colombo School of Computing (UCSC)

### **3. Project Methodology**

- 3.1 Syllabus and Examination Structure
- 3.2 Certification
- 3.3 Setting up Assessment Environment
- 3.4 Conduct of IT Proficiency Test
- 3.5 Evaluation of IT Proficiency Tests

### **4. IT Proficiency Testing Results**

- 4.1 Student Participation
- 4.2 IT Proficiency Test Results Summary

### **5. Analysis and Findings**

- 5.1 Average Student Performance in all study programs:
- 5.2 Performance of e-Test (IT Knowledge Test) among IRQUE funded Study Programs
- 5.3 Performance of the P1-test (Word Processing) among Study Programs
- 5.4 Performance of the P2-Test (Spreadsheet) among Study Programs
- 5.5 Comparison of Overall Performance in all study programs
- 5.6 Analysis of Performance considering Grades
  - 5.6.1 e-Test Grades Analysis with respect to Study Programs
  - 5.6.2 “P1-Test” Grades Analysis with respect to Study Programs
  - 5.6.3 “P2-Test” Grades Analysis with respect to Study Programs
  - 5.6.4 Grades Analysis of Overall Performance with respect to Study Programs
  - 5.6.5 Grades Analysis of All Study Programs

- 5.7 Analysis of performance with respect to Subject Streams
  - 5.7.1 Overall Performance with respect to subject stream
  - 5.7.2 Grade Analysis of Study Streams
  - 5.7.3 IT Knowledge and Practical Skill Analysis of Study Streams
  - 5.7.4 Classification of Study Streams with respect Performance
- 5.8 Comparison of Performance with respect to levels of Universities
- 5.9 Comparison of Performance with respect Funding Period

## **6. Conclusion and Recommendation**

## **7. References and Appendix**

- a. Appendix 1: Examination Structure
- b. Appendix 2: Syllabus for IT Proficiency Test
- c. Appendix 3: Sample Certificate of UCUL
- d. Appendix 4: Sample test papers used for Practical Assessments
- e. Appendix 5; SPSS Generated outputs related to analysis and findings

## **Preface and Acknowledgement**

After several initial discussions held between IRQUE project and University of Colombo School of Computing (UCSC), a proposal was submitted for this assignment. UCSC would like to thank IRQUE project and its senior staff, specially, Prof. L. L. Ratnayake and Dr. J L Ratnasekera for selecting UCSC to undertake this responsibility.

We would also like to thank academic, academic support and non-academic staff members of UCSC who helped and worked hard to carry out activities in this assignment to meet the deadline while attending to their normal other duties.

We also would like to thank Dr. Dilhari Attygalle and Ms. Dilshani Tissera from the department of statistics, University of Colombo, who helped to do the statistical analysis of the report.

UCSC was able to accept this assignment and complete it within the given time frame because of the resources, infrastructure and online environment developed by the National e-Learning Centre project (NeLC) funded by Sida (Swedish International Development Agency).

# 1. Executive Summary

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The IT Proficiency Test was carried out to evaluate the IT knowledge and skill of undergraduates following IRQUE QEF supported programs by the University of Colombo School of Computing (UCSC) under this assignment. It was planned to get a random sample of 50 students from each study program to do this evaluation. However, due to practical problems, described in this report, it was not possible to get an unbiased group of 50 students from all study programs. Therefore, some of our observations given in this report may be inaccurate and it is difficult to estimate this error without further analysis.

After gathering information from 27 study programs, the scope of IT Proficiency test was defined and communicated before carrying out the test. Online e-Testing environment was used to implement the testing process efficiently and effectively. It was managed using normal examination policies and guidelines established at UCSC. The test consists of two parts to access the knowledge and skills separately. A weighted average scheme was used to calculate the IT Proficiency of each candidate. Details are given in 3.1 and 5.5 of this report.

Due to lack of communication and practical problems, it was difficult to get all invited candidates participate in this evaluation. However, almost 50% of selected students took the tests and we were able to carry out tests for 25 out of 27 study programs. The average student participation is 29 with a very high variance. Therefore, the sampling method as well as sampling size is not very strong to justify conclusions given in this report. When conducting IT Proficiency tests, we also faced several difficulties due to poor IT resource management of study programs. Details are given in 3.4 of the report.

If we consider the pass mark as 50 (standard pass mark under GPA system), then only 355 students out of 714 (i.e. 49.7%) will be able to pass the test. However, UCSC decided to consider the pass mark as 40 since the majority of students are non-computing and various factors may have affected negatively to improve students IT skills. Then, 494 students out of 714 (i.e. 69%) were able to pass this Proficiency Test. However, detail analysis of student's performance shows some critical issues in the IT Proficiency of students in these study programs.

All study programs are regrouped according to 6 subject streams defined in 5.7 of this report. In general, Arts and Medicine is below our expected minimum proficiency requirement (40%) and all other streams also below 60%. At the same time, the skill level is below the knowledge level and all study streams are very poor in the spreadsheet development skill. Hence all study programs are below the professional level IT competency.

Although the majority of students have the minimum required knowledge and skills to use a computer, they do not possess the professional level competency required in the Job market. According to the grade analysis, majority of students have passed the tests scoring above 40 mark level, but less than 10% of students were capable to demonstrate the professional level knowledge and skills. Hence, this could affect the employability of students. At the same time, 7 out of 25 study programs failed to achieve the minimum requirement of overall performance (40 pass mark).

Universities are grouped according to levels defined in the IRQUE project for the analysis of data set. Private universities (with just two study programs though) have performed better than other levels of state universities with respect to obtaining higher grades (A or B). Level 3 universities (North and East Universities) have very good students as well as very poor students according to the analysis. In order to improve the relevance and quality of IT proficiency, more attention is required for state universities than private institutes. In this report, we also analyzed whether there is any effect on the funding period to enhance the IT proficiency level. The analysis doesn't support that the assumption of longer period of supporting the study program affects the improvement of IT proficiency.

According to the analysis of test results of IT Proficiency, all three tests (i.e. e-Test for IT Knowledge, P1-Test for Word processing and P2-Test for Spreadsheet) showed a varied (decreasing) level of performance. This observation was valid with respect to study programs, study streams or university levels. This finding could be the real situation in many undergraduate study programs irrespective of the sampling methods and the sample sizes in this analysis. Further analysis is required to identify the root causes for this low and decreasing level of performance. More actions would be required to enhance both the knowledge and skills of IT Proficiency in order to make these undergraduates more employable and productive knowledge workers in the future.

## **2. Introduction**

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### **2.1. Background - IRQUE QEF**

University education in Sri Lanka is offered by 14 conventional public universities with an enrolment of around 40,000 students and an Open University having an enrolment of 20,000 students. This represents a participation rate in university education of less than 3% of the age cohort and stands in sharp contrast to the higher rates in other South and South East Asian countries. Furthermore, the quality and relevance of many courses has led to high graduate unemployment with up to 40% of recent graduates being unemployed.

The Ministry of Higher Education (MoHE) has given priority to address the above issues and concerns of the present undergraduate education system. Commencing the Improving Relevance and Quality of Undergraduate Education (IRQUE) Project in 2003, the World Bank granted US \$ 40 million to the public and private higher education institutions in the country. The IRQUE project has two main components, namely building institutional capacity of the higher education system and Improving relevance and quality of higher education by establishing a Quality Enhancement Fund (QEF).

One of the premier features of the project is the introduction of, for the first time in Sri Lanka, a competitive funding scheme through QEF. The proposed competitive scheme of funding is aimed at improving undergraduate education by addressing issues such as internal and external efficiency, quality enhancement of teaching and learning process, relevance of current academic offerings, IT skills & English proficiency of undergraduates etc.

Two rounds of the competition for the QEF grants were conducted in 2005 and 2006. As a result, 27 Study Programs (SPs) representing 12 public universities and 2 non-UGC Higher Education Institutions were awarded grants.

### **2.2 Requirement and Objective of IT Skill Assessment**

To evaluate the impact of QEF Grants in terms of IT Proficiency of students, it is necessary to conduct an independent proficiency evaluation test covering all funded study programs. This assignment was initiated to satisfy this requirement.

In batch 1 of IRQUE funded programs, 17 QEF grants have completed five years of implementation, while 10 grants of batch 2 have completed four years of implementation. The proposed test should be conducted on a sample population of students in all 27 QEF Study Programs (i.e. grantees). It is recommended that the sample population of students in each Study Program be 50, and accordingly, the total sample population shall approximately be 1350. Considering possible absentees we decided to request all study programs to submit a list of 60 candidates.

UCSC was supposed to contact all study program coordinators to draft suitable a common syllabus. Since the base line test consists of two parts, one for theory and other one for skill assessment, it was suggested to follow the similar structure in this evaluation.

Initially, it was agreed to complete this assignment within 3 months period of time. All successful candidates will receive certificate from the UCSC.

### **2.3 University of Colombo School of Computing (UCSC)**

UCSC was established on 1<sup>st</sup> September, 2002, by merging the Institute of Computer Technology (ICT) and the Department of Computer Science (DCS), both of the University of Colombo, as a Centre of Higher Learning for the purpose of providing, promoting and developing higher education in Computer Science, and Information and Communication Technologies.

The UCSC has completed 7 years as a financially autonomous, academically integrated centre of higher education within the University of Colombo. The two institutions which merged to form the UCSC, DCS and ICT were established in 1985 and 1987 respectively. As such, in 2009, we celebrated 24 years of Computing as an entity within the University of Colombo.

At present the UCSC is engaged in providing ICT related services and human resource development with collaboration from several universities around the world and drawing from several donor organizations such as Japan International Cooperation Agency (JICA), Swedish International Development Agency (Sida) and International Development Research Centre (IDRC).

The UCSC has been identified as a Centre of Excellence in e-Learning. With highly qualified academic staff and state of the art facilities, the UCSC is ideally suited to meet the challenge of introducing e-Learning in Sri Lanka. In 2002, the UCSC commenced its e-learning development and services by establishing the e-Learning Centre. Its primary aim was to serve over 1000 internal and 5000 external students in their undergraduate programs. As such, it is now well positioned to expand its services beyond the confines of university education to meet the demands of the national human resource development requirements.

Presently the **e-Learning Center** of the UCSC has 25 members on its staff, who are committed to developing content for web-based education and to developing and maintaining Virtual Learning Environments (VLE) for student communities. This staff includes Software Engineers, System Administrators, Instructional Designers, Graphic Designers, Language Consultants and Language Editors.

The e-Learning centre (eLC) of the UCSC presently develops e-Learning courses for the well known external degree program – the Bachelor of Information Technology of the UCSC. Further, the eLC carries out research and development in e-Learning, especially developing e-Learning courses for the Sri Lankan context and developing e-Learning systems (based on the open source Modular Object-Oriented Dynamic Learning Environment (Moodle) Learning Management System (LMS) together with a specialized student information system).

One of the eLC's more recent projects is to develop an e-Testing platform in a supervised environment for the BIT degree program. For these initiatives, UCSC has received a recommendation award from UNESCO.

The **Advanced Digital Media Technology Centre (ADMTC)** was established under the University of Colombo School of Computing (UCSC) in order to implement the "Project for Human Resource Development in Information Technology through Capacity Building of UCSC" that was supported by the Japan International Cooperation Agency (JICA) as a three year Technical Cooperation Project between the Government of Sri Lanka and the Government of Japan from June 2002 to May 2005. This project had three major components.

- The establishment of Multimedia Laboratories, digital studio, and network capability to handle multimedia content.
- The training of trainers and content developers for web based training.
- Strengthening the Research and Development capabilities.



The **Language Technology Research Laboratory (LTRL)** was setup in 2004 to meet the demand for local language computing in Sri Lanka. After initiating and being instrumental in standardizing the basic localization infrastructure, the LTRL is presently engaged in developing language related tools (software applications) in Sinhala and Tamil for Text to speech, Optical Character Recognition, Electronic Dictionaries, and Spell Checkers.

In many of these activities it collaborates with international, regional and national bodies and has been funded by the IDRC of Canada. It also collaborates with industry partners such as Microsoft, Oracle and Google to bring localized interfaces to commonly used software. It works closely with the ICT Agency of Sri Lanka and the Sri Lanka Standards Institute in ensuring the appropriate local language technology infrastructure is in place in Sri Lanka.

The **Software Development Unit (SDU)** evolved within the Computing Services Centre in response to the increasing demand for the UCSC's niche expertise areas in the Software Industry. The SDU is known to produce quality low cost software with appropriate and effective technology particularly for the Sri Lankan public sector. The SDU has developed its own frameworks and processes for developing software which empowers its clients to take ownership of system and its maintenance.

Under the National e-Learning Centre (NeLC) Project funded by Sida (Swedish International Development Agency), UCSC started to expand its interest in e-Learning in other sectors of education, namely secondary, community and professional sectors of education in Sri Lanka. To facilitate this requirement, UCSC established a new program called Foundation in Information Technology (FIT) from the beginning of 2008 (<http://fit.bit.lk>).

The Foundation in Information Technology (FIT) programme aims on creating computer awareness together with skills in Mathematics and English since the latter is a compulsory for further application of ICT in education or industry. FIT program consists of three courses namely, UCSC Certified Computer Assistant (UCCA) (FIT 101), English for Communication and IT (FIT 201) and Fundamentals of Mathematics (FIT 301). More details about FIT program can be obtained from <http://fit.bit.lk>.

Research and Development is crucial to the whole enterprise that is the UCSC – in this case, in order to promote effective e-Learning in the Sri Lankan context. Ready made solutions which are usually built for developed countries have been found to be of little effect in the local context. At the UCSC's eLC, we use R&D work to build a better e-Learning framework and carry out postgraduate study projects. Several UCSC staff members are reading for their postgraduate degrees both locally and internationally in and around the area of Learning Technology. This has become possible owing to the wide network of International collaborators in e-Learning that the UCSC has developed over the years.

### 3. Project Methodology

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#### **3.1 Syllabus and Examination Structure**

After signing the agreement with IRQUE, we communicated with some study program coordinators to find out the computer awareness among students, how teaching and learning happened for skill development, and their computing facilities. We felt it is important to inform the program coordinators about the scope of testing we are going to conduct and how it will be conducted in advance. We prepared a syllabus defining the scope of testing and another documentation describing the structure of examination. These documents were circulated in advance to all study program coordinators. They are attached to the appendix of this report (Appendix 1, Introduction and Examination Structure and Appendix 2 – Syllabus of IT Proficiency Test). In developing the syllabus, it was decided to exclude some sections of office database application packages such as Microsoft Access and basic computer maintenance since many study programs have not covered these sections.

Since the majority of study programs are using Microsoft Office package, it was decided to use Microsoft Office 2003 or above to conduct IT proficiency test.

##### Structure of Examination

There will be three tests to access the candidate's skills.

(a) **Online e-Test to access the knowledge of fundamentals of ICT and knowledge required to work with the computer.**

Duration: 2hrs

No. of Questions: 40 MCQs

(Randomly selected 40 questions from a question base and listed after randomizing order of choices).

For the test questions were accessed through a secured connection from an online central testing system. Testing Question bank contains at least 120 Questions (1:3 ratio). Hence, randomization will be used to select questions as well as ordering them in a test.

(b) Access the word processing skills – one hour practical test based on Microsoft Word 2003.

A student is required to compose word processing document using Microsoft Word 2003 based on the instructions given within one hour. Student has to upload his/her answer to an online system for marking.

(c) Access the spreadsheet management skills – one hour practical test based on the Microsoft Excel 2003

A student is required to compose spreadsheet file using Microsoft Excel 2003 complete according to given instructions within the specified period time. Student has to upload his/her answer to an online system for marking.

#### **3.2 Certification**

According to draft syllabus, this assessment would be different compared to UCSC normal certification conducted at the Foundation of Information Technology program (<http://fit.bit.lk>), which is our branded program to test similar knowledge and skills. This would help to give a proper certificate for those who will be successful in the examination. After evaluating several certification names, we finally decided to brand this certificate as the “**UCSC Computer User License**” (UCUL). Designed certificate was attached to appendix 3 and it was finalized after obtaining feedback through Dr. Ratnasekara of the IRQUE office. Certificate will be distributed to all successful candidates in this evaluation.

### **3.3 Setting up Assessment Environment**

Online testing environment was developed according to the syllabus and several evaluations were carried out to evaluate the testing system if it is possible to accommodate more than 100 students concurrent testing.

At the same time, the online environment was used to facilitate the practical examination too. Each student had to submit their answers through online environment at the end of examination. Contingency plans were prepared to face technical and other failures during the examination. Manual test papers were also prepared under this plan. This helped us in overcoming several issues encountered in conducting the tests and we were able to conduct all tests without cancelling them due to technical difficulties.

Online environment was set up at <http://fit.bit.lk/lms> which is UCSC online learning and testing environment for FIT program.

Two sample practical test papers were attached in the Appendix 4 for information. We prepared similar papers for each test.

### **3.4 Conduct of IT Proficiency Test**

Scheduling of the IT Proficiency Testing was more difficult thing than we anticipated at the commencement of the assignment. This was the main reason to change our schedule in this assignment. Some study program coordinators were very friendly and collaborative but some others were not. Some coordinators considered this was unplanned activity in their schedule and it was unnecessary overhead. We explained its importance and requested their cooperation. Out of 27 study programs, we however were able to assess 25 programs (93%).

Sometimes it was not possible to conduct the test as we arranged due to various technical and practical issues of study programs. Below we summarize, our observations encountered when we arranged/visited to conduct IT proficiency tests are given in the Table 1.0.

#### **Overall Remarks – Conduct of IT Proficiency Testing:**

1. Initially, we requested coordinator to provide a list of eligible students for this test. We then selected 50 students using a random sampling method. However, it seems to be very difficult to get these students since this evaluation is not compulsory for students and many of students seem to be not interested to participate. We then decided to request the coordinator to select any 50 students who are willing to participate the test. This decision was taken after discussing IRQUE office and main objective was to improve the students participation in the IT test.
2. We always selected or requested the coordinator to select more than 50 students (at least 60), since it was very rare to get 100% participation.
3. We informed the students that they will get a certificate if they are successful in the test. Since this is not a compulsory test for them, many of students are not interested to participate in the test. (Some students have informed our invigilators that they got a similar promise from the previous testing organization but never heard about the results and no one got any certificate).
4. It was very sad to inform the support received from some coordinators is poor (although some are very friendly and helpful). What we understood, they really didn't motivate or take

seriously to get students participated in the testing process. As a result the student participation was very poor in some programs. One test we had zero participation since the coordinator didn't inform the location of test correctly. In another program, the coordinator wanted to cancel the arranged test due to sudden government holiday (which was not a big obstacle to conduct the test) and he was later not prepared to reschedule the test until the mid of July due to semester exams in the faculty.

5. Many study programs have received support from IRQUE projects to improve computing facilities but some study programs found difficult to get 50 computers with Internet connection. This was mainly due to poor resource management. For example, the Colombo medical faculty had more than 60 computers in their lab but only 16 machines were operational. Then the testing center was moved to another faculty which has a IRQUE funded lab (University of Colombo, IRQUE Computer Centre).
6. The Internet connection was underestimated in many places and some program coordinators are helpless due to technical issues. For example, APIIT was having high expectation with Dialog Shared bandwidth but practical bandwidth doesn't allow more than 10 concurrent access. Universities which are on the Learn network, have less problems except the University of Ruhuna and Jaffna. Ruhuna university had unexpected technical problem during the date of testing but coordinators were saying it is generally very fast. Jaffna university still does not have a good Internet connection according to information received from the IT testing coordinator of the program (Prof. Kumaravadival).

**Table 1.0: Conduct of IT Proficiency Testing at each study program**

	DATE of Conduct	Starting Time	UNIVERSITY	IRQUE Supported Programe	No. Students Selected /Nominated	Students Participated	Remarks and Comments
1	23-Mar-2009	1:00 PM	University of Moratuwa	Mechanical Engineering	60	44	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
2	28-Mar-2009	9:00 AM	University of Sri Jayewardenepura	Faculty of Medicine	60	47	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
3	2-Apr-2009	8:30 AM	University of Moratuwa	Dept. of Earth Resources	47	41	We requested a list of all students to select 50 students. But only a list of 47 students was given therefore selected all 47 student.
4	4-Apr-2009	8:00 AM	University of Peradeniya	Dept. of Sociology	60	0	List of 60 students was selected Randomly. After several discussions a test was arranged in advanced. The coordinator and his staff didn't inform the student the correct location of the test. No staff member was present during the testing day. UCSC staff was waiting few hours to reschedule the test but we received no cooperation from the program coordinators. <b>No student attended for the test.</b>
5	4-Apr-2009	1:00 PM	University of Peradeniya	Faculty of Science	60	14	List of 60 students selected Randomly. Coordinator is very cooperative. Very good computing facilities to conduct the test.
6	7-Apr-2009	9:00 AM	University of Kelaniya	Dept. of Commerce	67	50	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test. Student participation was very good. A power failure occurred while the test was conducting but no disturbance for the testing.
7	8-Apr-2009	10:00 AM	University of Moratuwa	Dept. of Civil Engineering	60	39	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
8	8-Apr-2009	9:00 AM	Asia Pacific Institute of Information Technology	Computing	60	43	List of 60 students was selected Randomly. Coordinator was very cooperative. Internet connection is very poor e-Test was cancelled and a manual evaluation was conducted.

9	24-Apr-2009	1:00 PM	Institute of Chartered Accountants of Sri Lanka	Accountancy	77	19	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test. Since some students were not interested to participate in the testing, another 17 students are selected. Initial testing date was postponed due to coordinators request to obtain more student participation.
10	29-Apr-2009	9:00 AM	Eastern University, Sri Lanka	Faculty of Agriculture	58	19	The computing facility was fair. The coordinator was absent during the test. Only 19 students were participated out of 58 students.
11	30-Apr-2009	9:00 AM	South Eastern University of Sri Lanka	Dept. of Social Sciences	60	29	List of 60 students selected Randomly. Coordinator is very cooperative. Very good computing facilities to conduct the test.
12	30-Apr-2009	1:00 PM	South Eastern University of Sri Lanka	Dept. of Languages	60	8	List of 60 students was selected Randomly. However, the cooperation was very poor from the study program coordinator. The student participation was also very unsatisfactory.
13	1-May-2009	9:00 AM	Sabaragamuwa University of Sri Lanka	Faculty of Agriculture	60	39	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
14	1-May-2009	1:00 PM	Sabaragamuwa University of Sri Lanka	Faculty of Applied Science	60	26	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
15	5-May-2009	1:00 AM	University of Sri Jayewardenepura	Dept. of Accountancy	56	34	List of 60 students was selected Randomly. Coordinator is very cooperative to conduct the test and tried her best to inform the students. Very good computing facilities to conduct the test.
16	7-May-2009	1:00 PM	Rajarata University of Sri Lanka	Faculty of Applied Science	44	14	We requested a list of all students to select 50 but only list of 44 was given, therefore selected all 44 student. Due to the dispute among the staff and the students, some student decided to boycott the exam at the last minute. The dean of the faculty tried her best to settle the issue and finally 14 students participated in the testing.
17	13-May-2009	1:00 PM	Wayamba University of Sri Lanka	Dept. of Food Science	47	19	Only a list of 47 students was provided when we request the coordinator to select 50-60 students. The coordinator thought it was not his responsibility in this assignment and passed his responsibility to the dean office. Staff of dean office helped us to have the testing but they were not in a position to persuade the students to participate the students.

18	14-May-2009	9:00 AM	University of Kelaniya	Dept. of Business Management	61	30	List of 60 students was selected Randomly. Coordinator was very cooperative. Very good computing facilities were available to conduct the test.
19	14-May-2009	1:00 PM	University of Kelaniya	Biological Sciences	63	13	Coordinator didn't put enough effort to get more students participated in the testing. Since the university was closed, we had to wait few weeks until it was opened.
20	16-May-2009	9:00 AM	University of Colombo	Faculty of Medicine	51	38	Due to technical issues at the medical faculty with respect to computers and Internet connection. Testing was conducted at IRQUE lab in the Arts faculty. Good cooperation from the coordinator, and he arranged the transport for the students too.
21	19-May-2009	9:00 AM	University of Peradeniya	Faculty of Agriculture	50	3	This is another example which shows the poor coordination from the study program. Sometimes, coordinators hand over their responsibilities to administrative or supporting staff who cannot persuade the students. Students were merely not interested to participate the testing. The coordinator was absent during the testing.
22	19-May-2009	1:00 PM	University of Peradeniya	Faculty of Veterinary Science	51	17	The testing was conducted at the agriculture faculty since this study program didn't have enough resources to conduct test for 50 students. The coordinator tried his best to get many students but number was not satisfactory.
23	20-May-2009	1:00 AM	University of Moratuwa	Dept. of Chemical Engineering	60	0	Test was supposed to hold on 20 the May 2009. Due to the sudden holiday announced by the government, the <b>coordinator wanted to cancel the test</b> . He was not willing to reschedule the test during months of May and June due to the semester exams.
24	26-May-2009	1:00 PM	University of Ruhuna	Faculty of Medicine	60	12	Test was once postponed to get more students but only 12 students were attended in the next schedule.
25	30-May-2009	9.00 AM	University of Jaffna	Faculty of Medicine	60	53	The test was conducted with the help of Prof. Kumaravadivel. Very good participation of the students.
26	5-Jun-2009	1:00 PM	University of Ruhuna	Dept. of Economics Social Science	48	15	It was very difficult to get a date for conducting test due to their time table. It seems to be the coordinator has tried his best but the participation was poor.
27	9-Jun-2009	9.00 AM	University of Jaffna	Bio Science	60	48	The initial test was postponed due to power failure but Prof. Kumaravadivel and Dr. Mahesan was very cooperative to reorganize the test on 9 <sup>th</sup> June 2009.
					1560	714	

### **3.5 Evaluation of IT Proficiency Tests**

Preparation of examination questions as well as marking answers of IT the test was conducted according to examination policies of the UCSC. Especially, the confidentiality of the data and process of the examination is protected and controlled according to the UCSC examination guidelines.

Every paper was prepared and moderated by two academic staff members. A coordinator and a supervisor together with invigilators were assigned to conduct the test at the location of the relevant study program.

Automated marking of online tests were analyzed using item analysis. At least two people were assigned marking practical answers submitted through the online environment.

The online test was marked considering 100 marks for 40 MCQs. Each question had one or more correct answers and was given equal weight (i.e. 2.5 marks) and negative marks were given for wrong choices. However, the minimum mark for a MCQ question is 0.

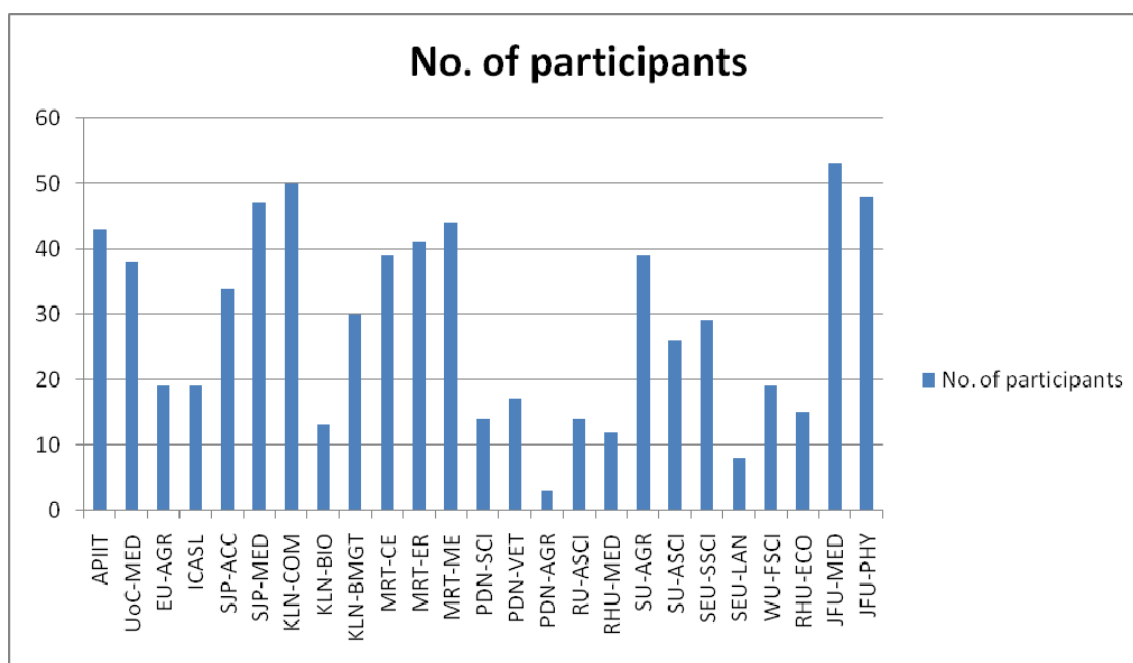
Each practical test for word processing and spreadsheet was marked considering the maximum to be 100 marks and it was a manual process. Overall mark was calculated considering 60% weight for MCQ test and 40% weight for the practical tests. Practical test mark was calculated considering 60% for word processing and 40% for spreadsheet assignment.



## 4. IT Proficiency Test Results

The test was conducted to cover all 27 study programs funded by IRQUE QEF but we were forced to cancel two tests due to reasons beyond our control as indicated in rows 4 and 23 of Table 1.0. There were 1560 students invited to participate in this test but only 714 students finally attended. Details are given in the table 1.0.

### 4.1 Student Participation



Student participation was the key to present the observation in this evaluation. We expected to get at least 45-50 students participating in each study program. However, due to practical problems the actual participation was below the expectation (28) and the variance was also higher than expected (15).

Average Participation: **29 Students per program**

Standard Deviation of Participation: **15**

**Observation: Student participation varied significantly with respect to each IT Proficiency test for study programs.**

#### 4.2 IT Proficiency Test Results Summary

No.	University	Study Program	IRQUE Batch	No. of participants	IT Knowledge Test (online MCQ test) (A)	Practical Test - Word Processing (B)	Practical Test - Spreadsheet (C)	Overall Average (60% of A + 24% of B + 16% of C)	Number of Student Pass (40 mark level)	% of Students passed
1	Asia Pacific Institute of Information Technology	Computing	B2	43	66	50	28	56	40	93%
2	University of Colombo	Faculty of Medicine	B1	38	50	30	7	38	18	47%
3	Eastern University, Sri Lanka	Faculty of Agriculture	B2	19	56	48	16	47	15	79%
4	Institute of Chartered Accountants of Sri Lanka	Accountancy	B1	19	57	53	53	56	17	89%
5	University of Sri Jayewardenepura	Dept. of Accountancy	B2	34	52	37	33	45	21	62%
6	University of Sri Jayewardenepura	Faculty of Medicine	B1	47	52	35	12	42	24	51%
7	University of Kelaniya	Dept. of Commerce	B2	50	54	42	30	47	37	74%
8	University of Kelaniya	Biological Sciences	B1	13	57	48	37	52	11	85%
9	University of Kelaniya	Dept. of Business Management	B1	30	55	51	44	52	26	87%
10	University of Moratuwa	Dept. of Civil Engineering	B2	39	59	59	24	54	33	85%
11	University of Moratuwa	Dept. of Earth Resources	B1	41	59	45	23	50	33	80%
12	University of Moratuwa	Dept. of Mechanical Engineering	B1	44	67	60	18	58	43	98%
13	University of Peradeniya	Faculty of Science	B2	14	58	42	12	47	10	71%
14	University of Peradeniya	Faculty of Veterinary Science	B1	17	62	48	29	53	16	94%
15	University of Peradeniya	Faculty of Agriculture	B1	3	23	35	5	23	0	0%
16	Rajarata University of Sri Lanka	Faculty of Applied Science	B1	14	48	45	28	44	8	57%
17	University of Ruhuna	Faculty of Medicine	B1	12	47	35	8	38	6	50%

18	Sabaragamuwa University of Sri Lanka	Faculty of Agriculture	B1	39	48	53	19	45	25	64%
19	Sabaragamuwa University of Sri Lanka	Faculty of Applied Science	B2	26	63	41	19	50	20	77%
20	South Eastern University of Sri Lanka	Dept. of Social Sciences	B1	29	45	25	11	35	5	17%
21	South Eastern University of Sri Lanka	Dept. of Languages	B2	8	38	28	9	31	1	13%
22	Wayamba University of Sri Lanka	Dept. of Food Science	B2	19	57	53	36	53	17	89%
23	University of Ruhuna	Dept. of Economics	B1	15	34	43	18	33	6	40%
24	University of Jaffna	Faculty of Medicine	B1	53	40	39	16	36	19	36%
25	University of Jaffna	Physical Sciences	B2	48	61	80	49	64	43	90%
Average and Total				714	52	45	23	47	494	69%

The Pass mark for similar examinations including for FIT certification is 50. However, due to the low overall pass rate (50% - 355 out of 714) the Board of Examination at the UCSC recommended considering the pass mark as 40 for this IT Proficiency test. Hence finally, 69% - 494 out of 714 passed the examination.

## 5. Analysis and Findings

### 5.1 Average Student Performance in all study programs:

The three tests carried out are named as follows:

e-Test (IT Knowledge Test)[Etest]

P1-Test (Practical Test 1 – Word Processing) [Word]

P2-Test (Practical Test 2 – Spreadsheet) [Excel]

	N	Minimum	Maximum	Mean	Std. Deviation
Etest	714	.00	85.21	54.2921	15.92280
Word	714	.00	100.00	46.6499	22.53078
Excel	714	.00	95.00	24.4762	21.25977
Valid N (listwise)	714				

Table 5.1: Overall Average Performances for the Tests

Among the three tests, the best performed was the e-Test (IT Knowledge Test) with an average mark of **54.3**. The lowest performance was shown in P2 Practical Test (Spreadsheet - Excel) with an average as low as 24.5.

Appendix 5 (Table 5.A) gives details of test marks with respect to each study program.

### 5.2 Performance of e-Test (IT Knowledge Test) among IRQUE funded Study Programs

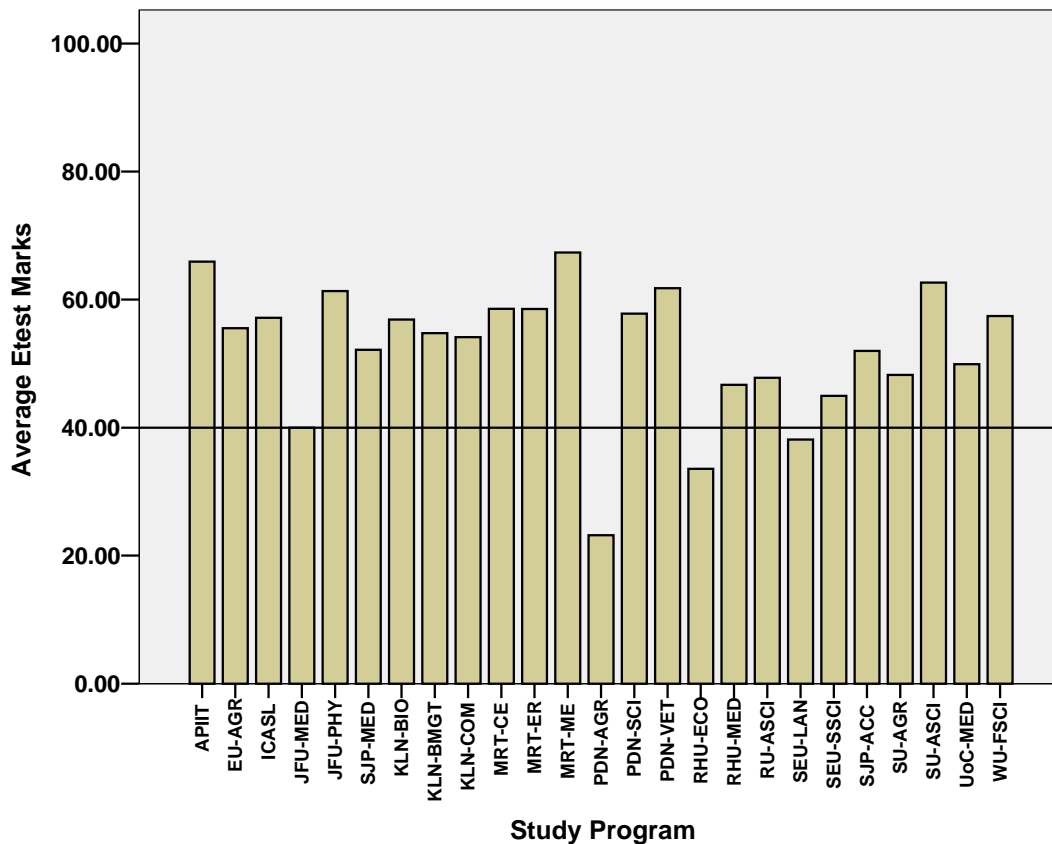
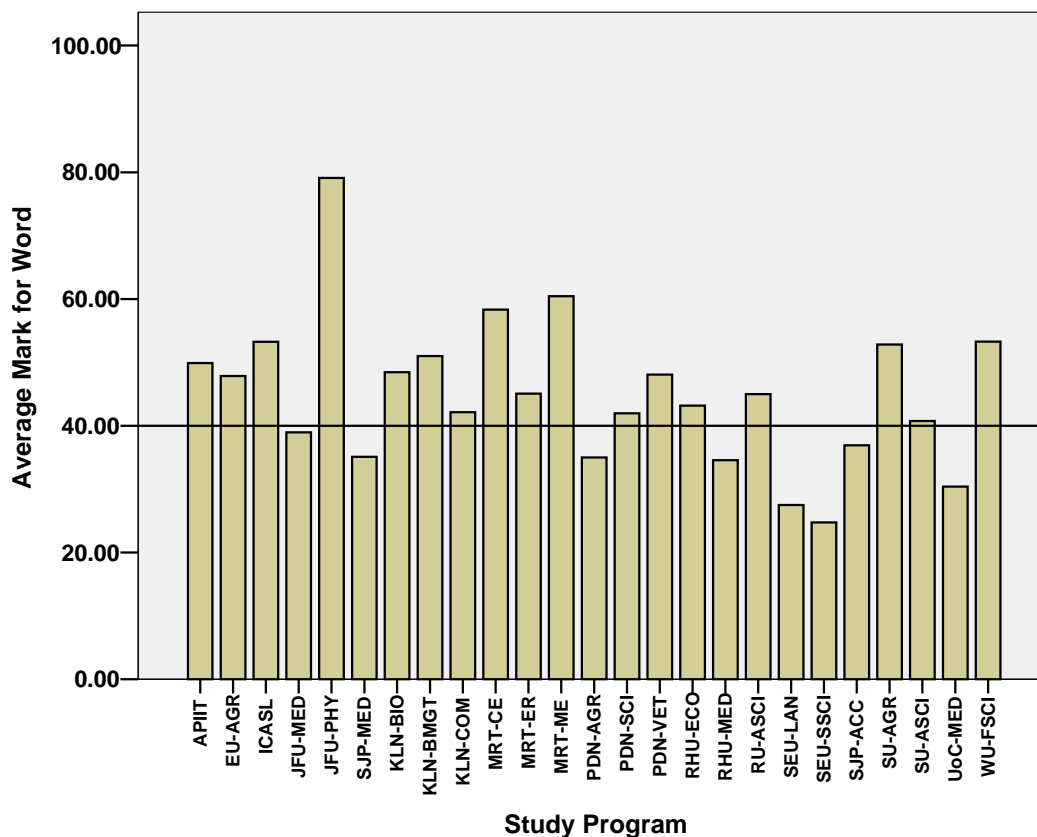


Figure 5.2.A: Study Programs' Average Performance in IT Knowledge Test

Considering the pass mark as 40, the above figure (5.2.A) reveals that, apart from 4 study programs (out of 25) all study programs had on average passed the IT Knowledge Test. The overall best performance was by the students of the University of Moratuwa, Mechanical Study program with an average of 67.4 while the lowest performance was by the students of the University of Peradeniya, Agriculture study program with an average of 23.2.

The average mark with the majority of Study Programs was between 40–60. Although some students had mentioned that the e-Test was very easy and they did not utilize the 2 hours allocated for the evaluation, there were only 4 study programs exceeding an average of 60. However, the individual mark obtained by some students was very high in this e-test (IT Knowledge).

### **5.3 Performance of the P1-test (Word Processing) among Study Programs**



**Figure 5.3.A: P1-Test Performance with each study program (Word Processing)**

The highest average mark for the P1-Test (Word Processing) had been obtained by the students of University of Jaffna, Physical Science Study program, while the lowest average had been obtained by the students of University of South Eastern, Social Science study program, the averages being 79.1 and 24.7 respectively.

The average performance in many study programs were over 40 marks (17 out of 25 programs – 68%) indicating that many students are aware of using the word processing tool. However, the average mark with the majority of the study programs did not exceed 60, indicating that the students do not know beyond basic Word Processing skills. Such a result students would find it difficult to develop a professional document without assistance.

## 5.4 Performance of the P2-Test (Spreadsheet) among Study Programs

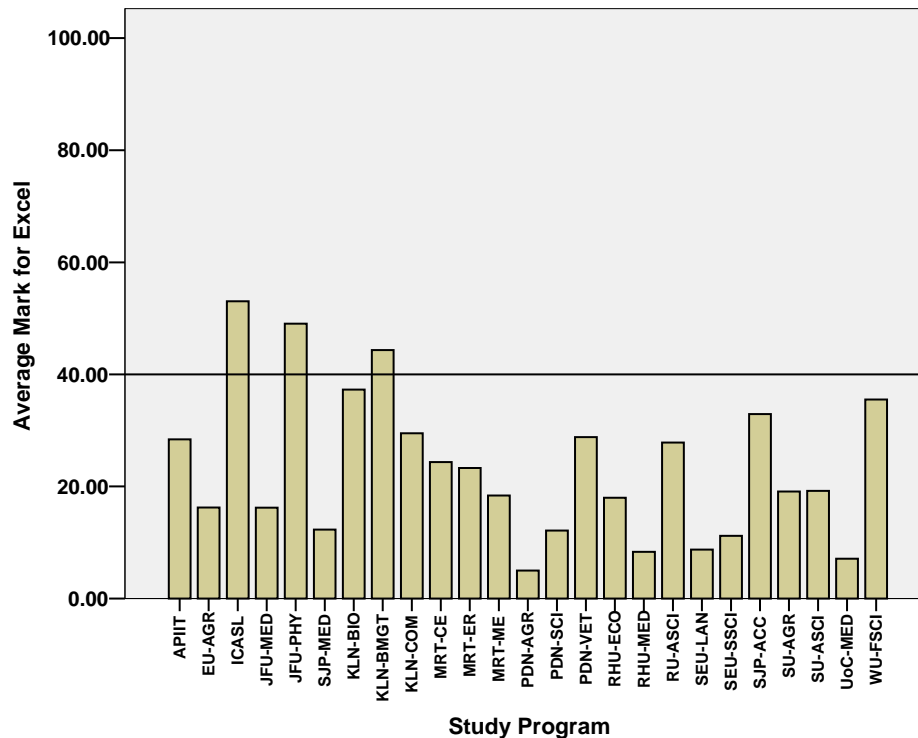


Figure 5.4.A: P2-Test (Spreadsheet)

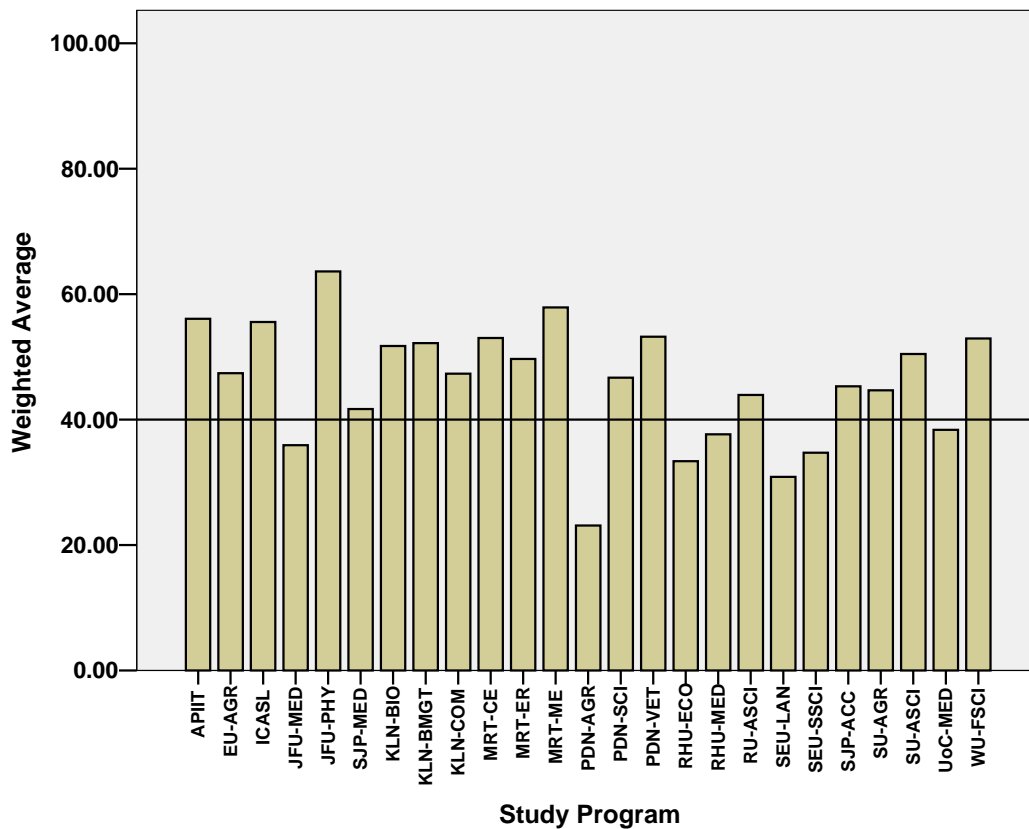
Spreadsheet skills are very useful for anyone who wants to do a research in any field or who is planning to work in a modern office environment. The practical exercise given in this test (P2-Test) was very basic and simple (please refer Appendix 4). However, the average performance in many study programs is below 40 (88%), indicating a comparatively low performance. In fact there were students who were not able to score even a single mark in both practical tests.

It should be noted that only three study programs have achieved the pass mark of 40 (12%). Those are; Institute of Chartered Accountancy, University of Jaffna Physical Science and University of Kelaniya Management study program, achieving averages of averages of 53.1, 49.1 and 44.3 respectively.

## 5.5 Comparison of Overall Performance in all study programs

Overall performance was determined combining all three tests using a weighted average scheme. 60% weight was given to the IT knowledge test and the rest was given to two practical tests. Since the word processing skill is more required in real world applications, it was given a 60% weight out of skill assessment (practical tests), and the balance 40% was given to the spreadsheet preparation skills. Hence the overall performance was determined as follows:

**Overall Performance = 60% of e-Test + 24% of P1-Test + 16% of P2-Test**



Many study programs were able to obtain an average performance between 40-60 marks, just one study program exceeding a score 60. At the same time, the performance of students of 7 study programs was below 40 (28%), while three of them were medical study programs.

The overall performance was the best with Jaffna University Physical Science study program while the lowest average was with the Peradeniya agriculture study program, the averages being 63.6 and 23.1 respectively.

### **5.6 Analysis of Performance considering Grades**

In earlier sub-sections, we analyzed the overall performance of study programs in general. We now consider the performance with respect to grades, using the grading scheme defined below. Table 5.1. Table 5.A, 5.B, 5.C and 5.D of Appendix 5 will describe the percentages in details

Grade	Marks	Comment
F	Below 40	Poor performance
C	40-54	Fair and Average Performance
B	55-69	Good Knowledge and Skill
A	70 and above	Very Good Knowledge and Skill (Professional Level)

**Table 5.2: Grading Scheme for the Tests**

### 5.6.1 e-Test Grades Analysis with respect to Study Programs

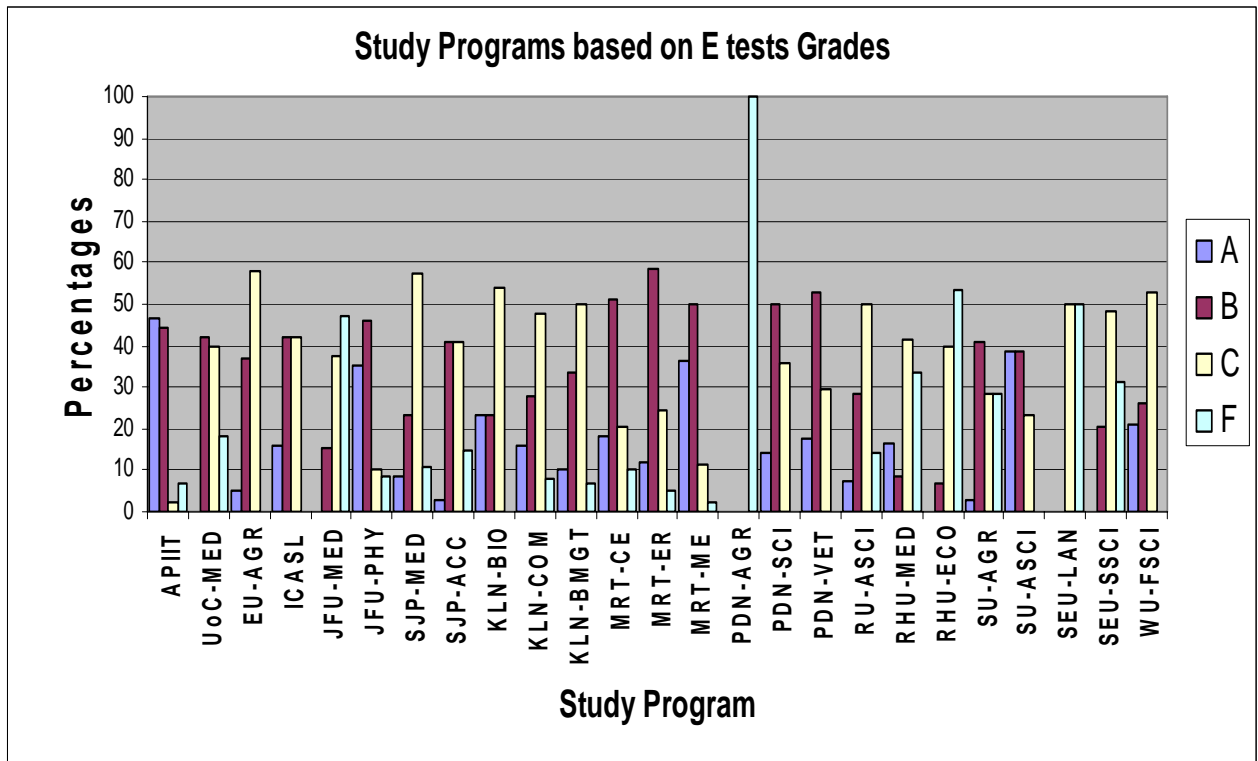
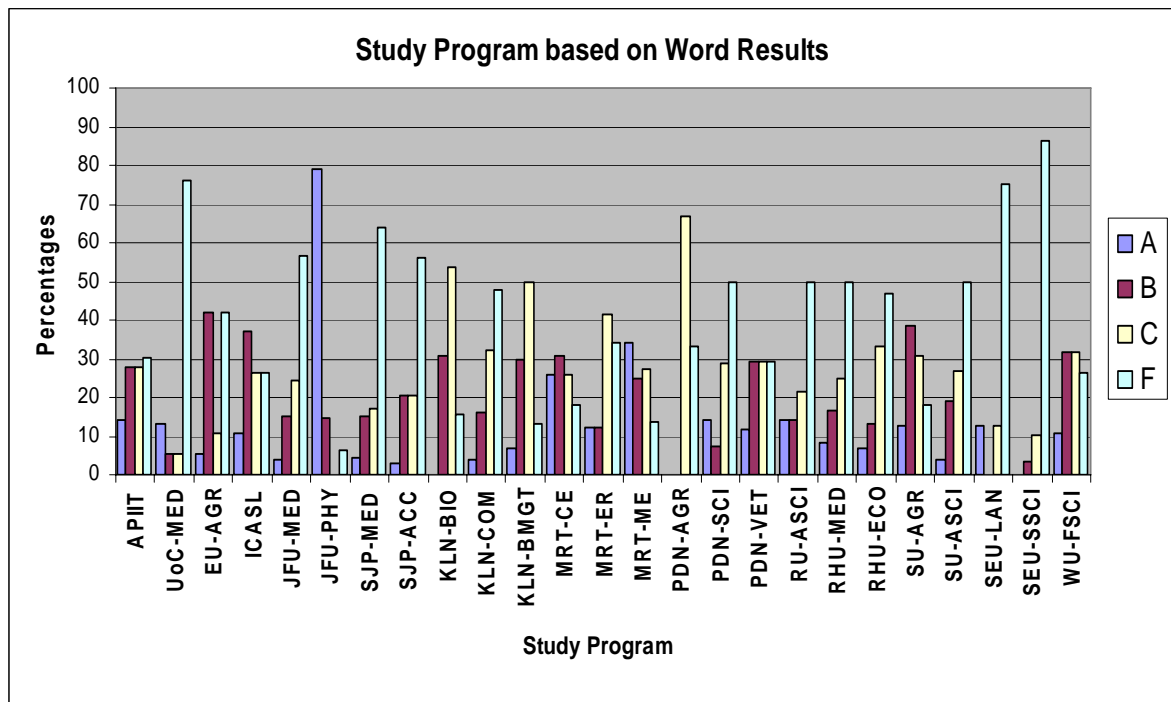


Figure 5.6.A: Study Programs Based on E-Test Grades

For the knowledge test, the highest percentage of A grades was obtained by APIIT followed by the University of Sabaragamuwa Applied Science, Moratuwa Mechanical Engineering and then Jaffna Physical. Although the University of Peradeniya Agriculture study program, shows a 100% failure rate, but it should be noted that the result was based on just 3 students.



### 5.6.2 “P1-Test” Grades Analysis with respect to Study Programs



Although a high percentage (80%) of students from University of Jaffna, Physical Science program got “A” grades, with all other programs, the percentage of “A” grades were below 35%.

It is also noted that the failure rates were high with South Eastern Social Sciences, University of Colombo Medical, South Eastern University Languages and University of Jayawardenapura Medical, having percentages of “F” grades 86.2%, 76.9%, 75.0% and 65.83% respectively.

Word processing is the basic skill required to use a computer for document preparation. With some study programs, however, a majority of students failed to score even the minimum pass mark of 40.

### 5.6.3 “P2-Test” Grades Analysis with respect to Study Programs

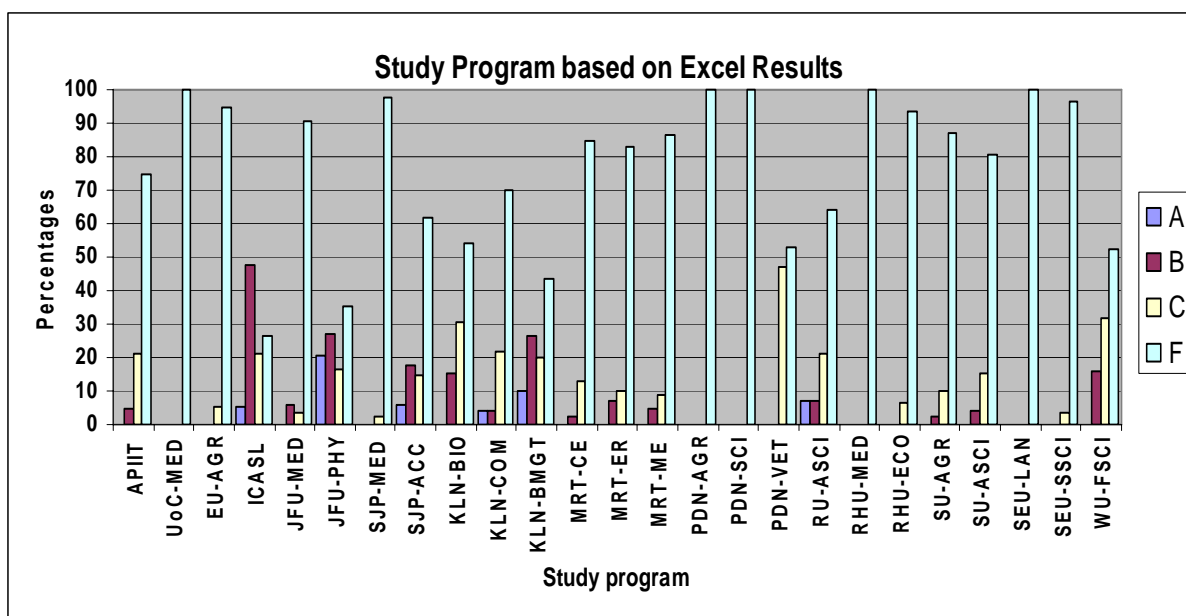


Figure 5.6.C: Study Programs Based on Excel Grades

The knowledge and skill with spreadsheets is required for anyone who wants to use a computer effectively for higher studies or in a modern office environment. It is sad to mention that performance in Excel was extremely poor and below the level of acceptance. Only the study program at the Institute of Chartered Accountant was able to show even the minimum level of competency in this skill.

### 5.6.4 Grades Analysis of Overall Performance with respect to Study Programs

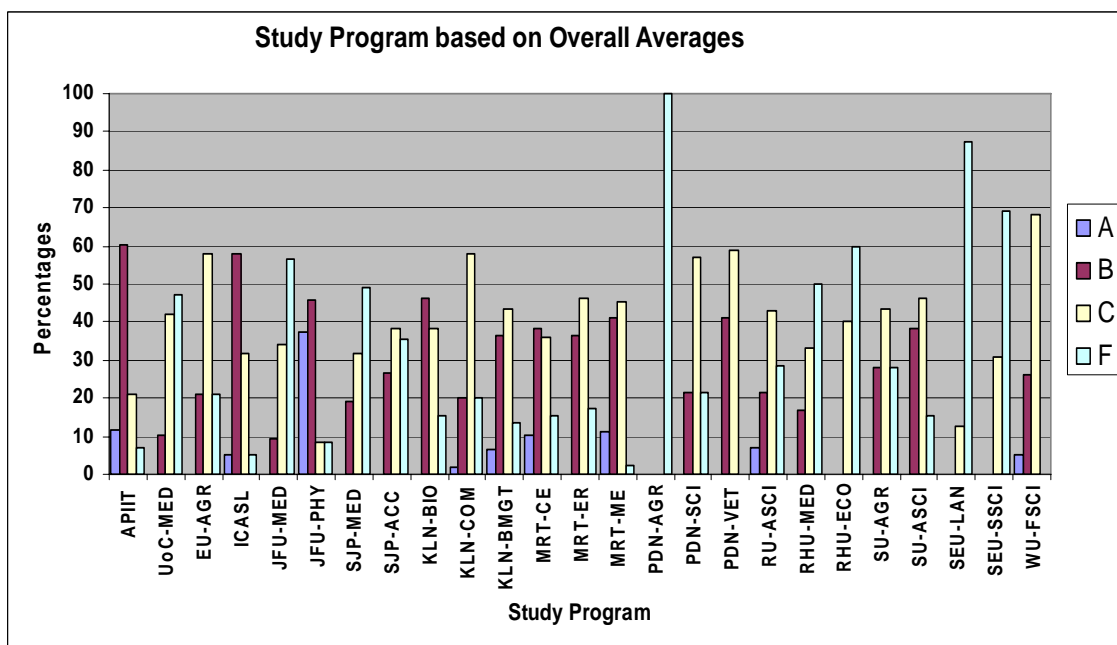


Figure 5.6.D: Study Programs Based on grades for Overall Performance

Many students in all study programs were able to obtain a “B” or a “C” grade in the overall performance but the percentages of “A” grades (professional level) is low with a majority of the study programs except with the Physical Science study program at the University of Jaffna. This

means that, although students have the basic knowledge and skills required to use a computer, they may fail to convince potential employers when seeking employment in future.

The failure rates of Paradeniya Agriculture, South Eastern Social Science and South Eastern Languages are very high (above 60%) and their performance is below the level of acceptance. It is also important to mention that the number of students participated in this survey from these study programs is below 10, except from the South Eastern Social Sciences.

### 5.6.5 Grades Analysis of All Study Programs

			Grade				Total
			A	B	C	F	
Test	ETest	Count	111	257	243	103	714
		%	15.5%	36.0%	34.0%	14.4%	100.0%
	Word	Count	19	57	91	547	714
		%	2.7%	8.0%	12.7%	76.6%	100.0%
	Excel	Count	38	206	278	192	714
		%	5.3%	28.9%	38.9%	26.9%	100.0%
Total		Count	168	520	612	842	2142
		%	7.8%	24.3%	28.6%	39.3%	100.0%

**Table 5.3: Average Performances for the Tests**

It is possible to statistically prove (Using a Chi-Square test for Association) that there is an association between the Grades and the three tests. This shows that the performance of the students with respect to the three tests differ significantly.

The analysis of the grades indicates that, although the majority of students have passed in this test, only a less than 10% is capable to have professional level of knowledge and skills required by the Job market. However, many students possess the required basic knowledge on how to use a computer but their skill in using a computer effectively, is very poor (according to “F” in P1-Test(Word) and P2-Test(Excel).

## **5.7 Analysis of performance with respect to Subject Streams**

Further analysis revealed that the performance may differ with the subject streams and thus the 25 Study programs were classified in to six main streams as given in the following table.

<b>Stream</b>	<b>Study Program</b>
Arts	Ruhuna Social Science (RHU-SSCI) South Eastern Social Science (SEU-SSCI) South Eastern Languages (SEU-LAN)
Bio (Biological and Agriculture)	Eastern University – Agriculture (EU-AGR) University of Kalaniya Biological Sciences (KLN-BIO) University of Peradeniya – Agriculture (PR-AGR) Sabaragamuwa University- Agriculture (SU-AGR) Wayamba University – Food Science (WU-FSCI)
Com (Commerce and Management)	Institute of Chartered Accountants in Sri Lanka (ICASL) University of Kalaniya – Business Management (KLN-BMGT) Jayawardanapura University – Accountancy (SJP-ACC) University of Kalaniya – Commerce (KLN-COM)
Computer	Asia Pacific Institute of Information Technology - APIIT
Maths	University of Jaffna – Physical Science (JFU-FSCI) University of Moratuwa Civil Engineering (MRT-CE) University of Moratuwa Mechanical Engineering (MRT-ME) University of Moratuwa Earth Resources (MRT-ER) University of Peradeniya Physical Science (MRT-PSCI) Rajarata University – Applied Science (RU-ASCI) Sabaragamuwa University – Applied Science (SU-ASCI)
Medicine	University of Colombo – Medical Faculty (UoC – MED) University o f Jayawardanepura – Medical (SJP –MED) University of Peradeniya - Veterinary Science (PDN – VET) University of Ruhuna – Medical (RHU – MED) University of Jaffna – Medical (RHU – MED)

**Table 5.4: Classification of Study Programs with respect to streams**

### 5.7.1 Overall Performance with respect to subject stream

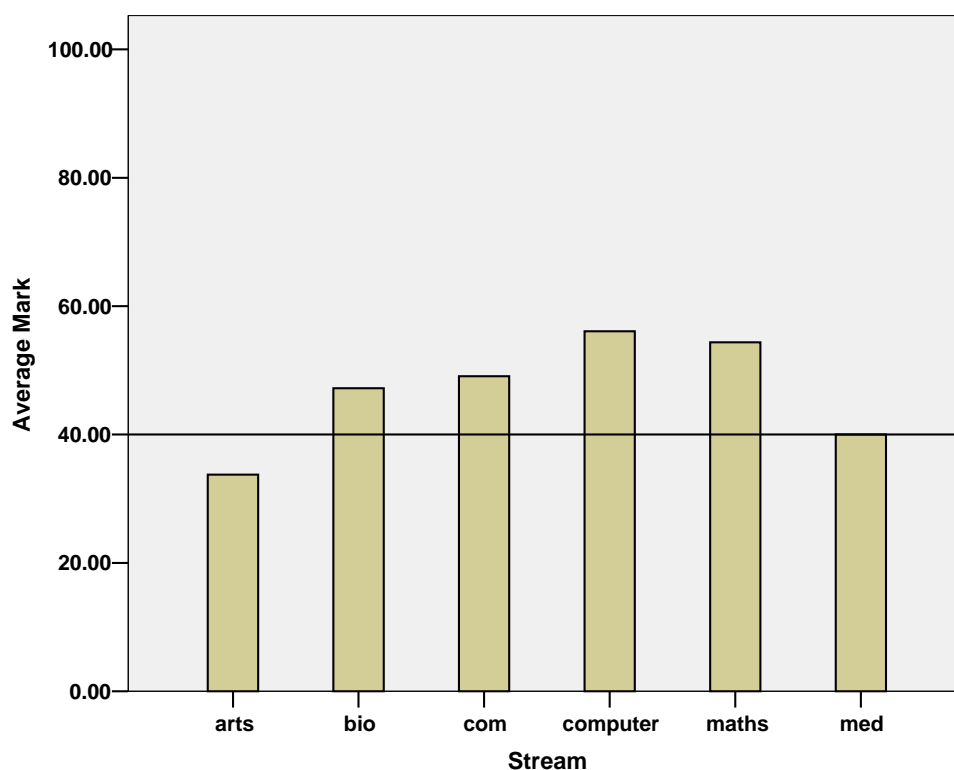


Figure 5.7.A: Overall Performance among Streams

The overall performance appears to be the best for the computer science stream where as the worst performance was for arts. However since the performance was found to be different with respect to each test in the previous analysis, we further investigated it with respect to grades and type of test.

In general, Arts and Medicine is below our expected minimum proficiency requirement and all other streams also not exceeding the 60 mark level. None of the study streams show a professional level of knowledge and skills in the IT Proficiency.

## 5.7.2 Grade Analysis of Study Streams

			Grades				Total
			A	B	C	F	
Stream	arts	Count	0	0	16	36	52
		%	.0%	.0%	30.8%	69.2%	100.0%
	bio	Count	1	26	46	20	93
		%	1.1%	28.0%	49.5%	21.5%	100.0%
	com	Count	4	41	61	27	133
		%	3.0%	30.8%	45.9%	20.3%	100.0%
	computer	Count	5	26	9	3	43
		%	11.6%	60.5%	20.9%	7.0%	100.0%
	maths	Count	28	86	83	29	226
		%	12.4%	38.1%	36.7%	12.8%	100.0%
	med	Count	0	27	63	77	167
		%	.0%	16.2%	37.7%	46.1%	100.0%
	Total	Count	38	206	278	192	714
		%	5.3%	28.9%	38.9%	26.9%	100.0%

Table 5.5: Performances within Streams with respect to Grades

According to Chi-Square test, there is Statistical Evidence to say that the performance with respect to grades is different for the 6 study streams.

Further Analysis revealed (Appendix 5) that no single student from the Arts and Medicine streams was capable of demonstrating skills in IT Proficiency. It is also worth noting that 12-7% of students in the Maths and Computing streams below the level of expectation, although they are following IT related subject content in these streams.

## 5.7.3 IT Knowledge and Practical Skill Analysis of Study Streams

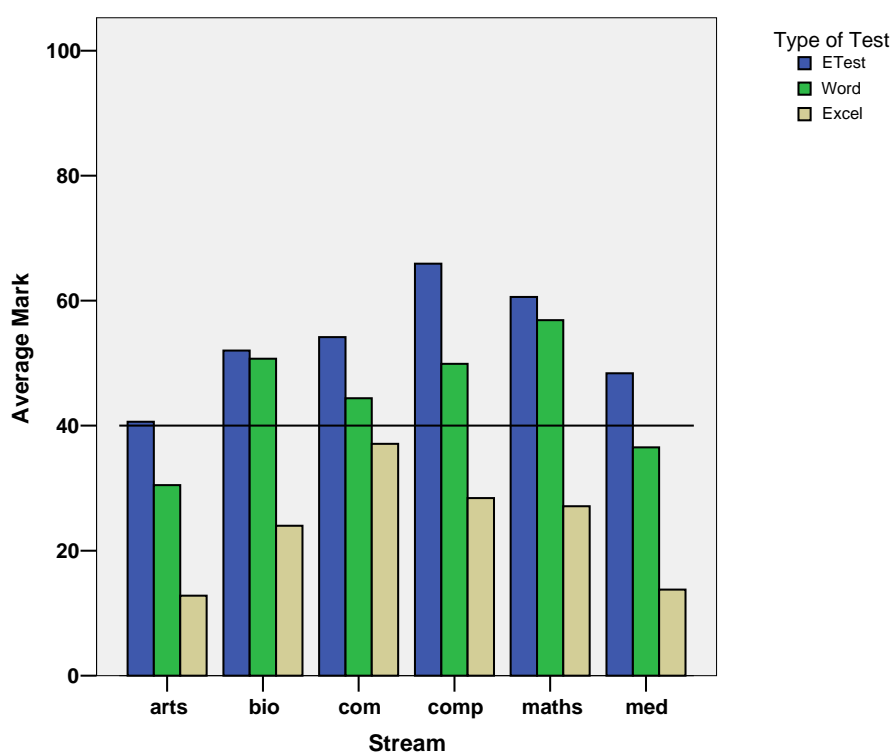


Figure 5.7.B: Performances for tests Among Streams

With every stream, the overall performance for the e-Test is the best within the stream. A poor performance is observed for P1-Test (Spreadsheet – Excel) with all six streams. In general, all streams have reached or gone above the required level of 40 marks with respect to basic IT Knowledge. However, only the computing stream had achieved a mark above 60, but they are below the 70 mark level of Professional Proficiency.

Except the Arts and Medicine streams, all other streams have achieved the minimum requirement of skill level with respect to word processing but they are again below 60 mark level and do not demonstrate a good IT skill. On other hand, all subject streams are poor with respect to spreadsheet skills and they are below the expected requirement of 40 mark level. To demonstrate acceptable level of IT Proficiency we expect at least a minimum level (40 marks) with respect to all three tests. Unfortunately, none of study streams achieved this level.

#### 5.7.4 Classification of Study Streams with respect Performance

Further exploration carried out with performance with respect to study streams revealed that performances of certain subject streams are similar. Following results will show those sub-groupings.

s_code	N	Subset for alpha = .05		
		1	2	3
Arts	52	40.6283		
Med	167		48.3730	
Bio	93		52.0090	
Com	133		54.1619	
Maths	226			60.6103
Comp	43			65.9381

**Table 5.6: Classification with respect to e-Test (IT Knowledge Test) Performance:**

The analysis revealed that the performance of the e-Test is the lowest for the Arts stream and can be considered as a separate group. Medical, Bio and Commerce performed similarly and can be grouped together. Computer and Maths fall in the same group with the best performance.

s_code	N	Subset for alpha = .05		
		1	2	3
Arts	52	12.7885		
Med	167	13.7605		
Bio	93		23.9677	
Maths	226		27.1195	
Comp	43		28.4186	
Com	133			37.0902

**Table 5.7: Classification with respect to P2-Test (Spreadsheet – Excel ) Performance:**

With a similar analysis for P2-Test (Spreadsheet – Excel), it is revealed that the performance of commerce stream is the best and forms a separate group. The weakest group is formed by Arts and Medicine. The other group is formed by Bio, Maths and Computer streams.

It was also identified that with test for P1-Test (Word processing –Word), the sub-groupings did not appear clearly.

s_code	N	Subset for alpha = .05			
		1	2	3	4
Arts	52	33.7385	39.9941		
Med	167				
Bio	93			47.2119	
Com	133			49.0836	
Maths	226				54.3588
Comp	43				56.0820

**Table 5.8: Classification with respect to overall performance:**

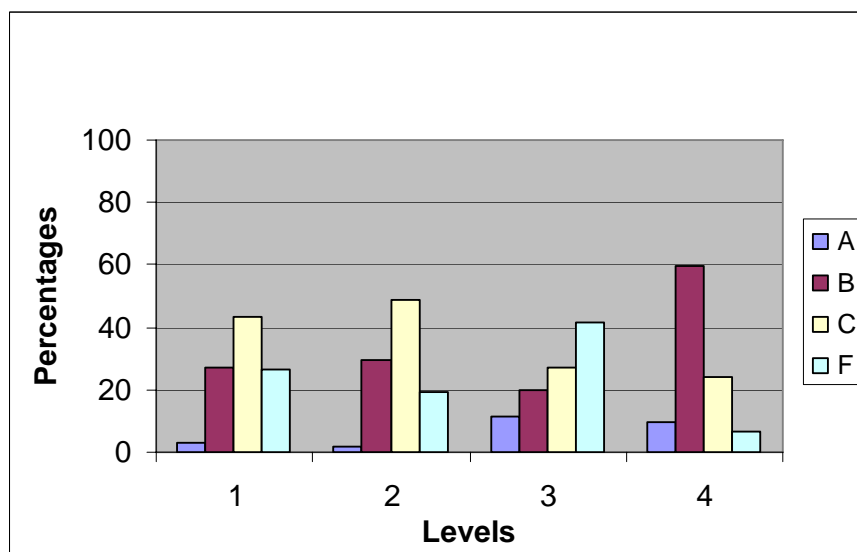
When considering the weighted averages, the overall performance was similar for Maths and Computer Science study streams while becoming the best performed sub-group of streams. The next best sub-group was formed by Bio and Commerce. Arts and Medicine formed separate groups on their own, while the performance of arts being poorer than Medicine.

### **5.8 Comparison of Performance with respect to levels of Universities**

IT Proficiency test results were analyzed with respect to Universities of Study Programs. Universities are grouped according to classification used in the IRQUE Project for the QEF Program. The following table shows the classification of universities.

Level No.	Institute Name
1	University of Colombo University of Moratuwa University of Jayawardenapura University of Peradeniya University of Kelaniya University of Ruhuna
2	University of Rajarata University of Sabaragamuwa University of Wayamba
3	University of Jaffna Eastern University South Eastern University
4	APIIT Institute of Chartered Accountancy

**Table 5.9: Levels of Universities:**



**Figure 5.8.A: Levels of University for Grades**



			Overall Grade				Total
			A	B	C	F	
level	1	Count	12	109	172	104	397
		%	3.0%	27.5%	43.3%	26.2%	100.0%
	2	Count	2	29	48	19	98
		%	2.0%	29.6%	49.0%	19.4%	100.0%
	3	Count	18	31	43	65	157
		%	11.5%	19.7%	27.4%	41.4%	100.0%
	4	Count	6	37	15	4	62
		%	9.7%	59.7%	24.2%	6.5%	100.0%
Total		Count	38	206	278	192	714
		%	5.3%	28.9%	38.9%	26.9%	100.0%

**Table 5.10: Performance with respect to Levels of Universities:**

It is evident that there is a significant difference in performance with respect to levels of institutes. (The Chi-Square test for association has shown a significant association between the level and the grades) Level 3 universities have the highest value of “A” grades as well as “F” grades with respect to other universities. In general performance of level 4 universities is the best. However, these results may not be able to generalize, as the surveyed sample is not representative of all institutes in Sri Lanka.

## **5.9 Comparison of Performance with respect Funding Period**

27 Study programs are supported in two stages under IRQUE QEF Program. Batch 1 consists of 17 study programs and Batch 2 consists of 10 programs. Hence, all students are regrouped as batch 1 and batch 2 based on the relevant funding period of the study program to find out whether there is any effect on the funding period and IT performance.

batch		N	Mean	Std. Deviation
1	Etest	414	51.5420	15.46233
	Word	414	43.3333	21.33924
	Excel	414	20.8454	19.74916
	Average	414	44.6605	14.32235
	Valid N (listwise)	414		
2	Etest	300	58.0874	15.79307
	Word	300	51.2267	23.35144
	Excel	300	29.4867	22.26242
	Average	300	51.8647	14.58293
	Valid N (listwise)	300		

**Table 5.11: Descriptive with respect to Funding Period:**

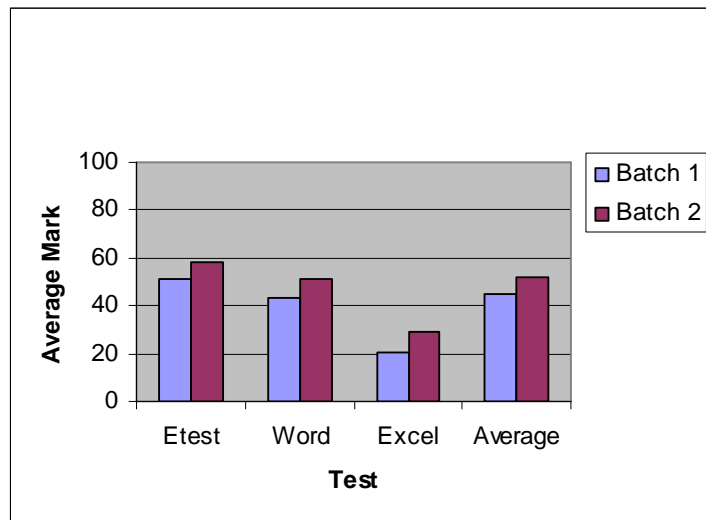


Figure 5.9.A: Test results between Batches of funding period

In general, the performance with respect to each test as well as with the oval average, Batch 2 is better than Batch 1. However, the sample sizes as well as the sampling procedures (selected by the respective coordinators according to availability of students) are different in these batches.

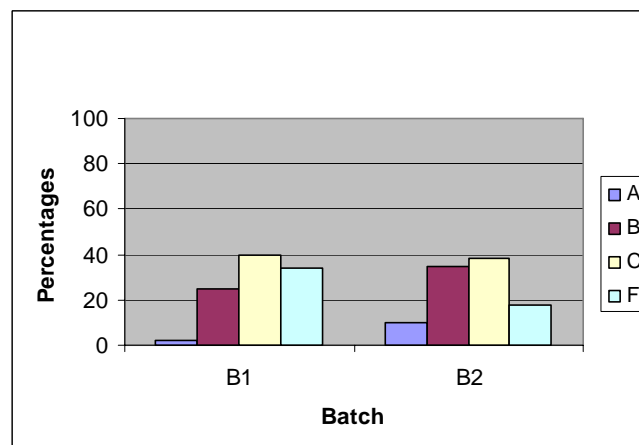


Figure 5.9.B: Comparison of Two Batches with respect to Grades

			Overall Grade				Total
			A	B	C	F	
batch 1	Count		9	102	164	139	414
	%		2.2%	24.6%	39.6%	33.6%	100.0%
2	Count		29	104	114	53	300
	%		9.7%	34.7%	38.0%	17.7%	100.0%
Total	Count		38	206	278	192	714
	%		5.3%	28.9%	38.9%	26.9%	100.0%

Table 5.11: Performance within Batches

Even with respect to grades, percentages of A's and B's of batch 2 are high in comparison to those of batch 1. The chi-square test for Association (Appendix 5) gives the statistical evidence to justify above observation.

**Overall Observation:**

According the information of this survey, the increase of funding period has not improved performance but rather worsen. It is strongly believed, however, that this opposite effect is due to the sampling methodology used.

## 6. Conclusion and Recommendation

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The Consultancy on Conducting a Test for Information Technology Proficiency of Students was awarded by IRQUE Project to the University of Colombo School of Computing (UCSC) to assess the undergraduates following study programs supported by IRQUE QEF program. This is the final report of this consultancy, which compiles the results, analysis and findings of tests carried out during this consultancy.

UCSC first gathered information from the study programs to determine the subject content for the testing. Testing structure consists of two parts to assess the knowledge and skills required for the Information Technology Proficiency when someone wants to use a computer effectively, particularly to prepare electronic documents and spreadsheets. Scope of assessment was defined in a detail syllabus which was circulated among all coordinators of 27 study programs in advance of conducting the test. Online e-Testing environment was used to carry out this testing under the direct supervision of examiners appointed by the UCSC. The Process of Testing was managed according to examination guidelines established at the UCSC while protecting confidentiality and minimizing errors that could occur in the process.

Part 1 of the IT Proficiency test (described as the e-Test in this report, given two hours) consists of 40 MCQs randomly selected from a question base of 120 questions to evaluate the basic knowledge required to use a computer effectively. Part 2 of the test consists of two practical tests (described as the P1-Test and P2-Test) covering the word processing and spreadsheet management each to be answered in 1 hour. Main objective of the practical test was to assess the candidates' skills to use a computer to prepare an electronic document and spreadsheet based on the given instructions. Overall performance is determined combining all three tests using a weighted average scheme. 60% weight was given to the IT knowledge test and the rest was given to two practical tests. Details are given in the section 4.5.

It was planned to select 50 students from each study programs using a statistical sampling technique. However, due to practical issues in each study programs, there were a high percentage of absentees for the IT test. We requested coordinators to nominate at least 60 students and to propose a convenient date and time of their choice within the specified period. Although some coordinators were very collaborative and friendly to conduct this evaluation, some others didn't understand its importance. As a result of that we were able to evaluate only 714 students (46%) after inviting more than 1500 students. We were able to carry out 25 tests and forced to cancel 2 tests due to lack of cooperation. The average student participation was 29 with a standard deviation of 15. Therefore, the sampling method as well as sampling size is not very strong enough to justify conclusions given in this report.

In addition to conducting IT Proficiency Test, we were able to observe the IT Resource Management of different study programs. IRQUE Project funded several study programs to acquire computers and Internet connectivity for the laboratories but some of them were failed to facilitate us to conduct the test and coordinators arranged alternative locations to conduct IT tests. Details are given in the section 2.4.

If we consider the pass mark as the 50 (standard pass mark under GPA system), then only 355 students out of 714 (i.e. 49.7) will be able to pass the test. However, UCSC decided to consider the pass mark as 40 since the majority of students are non-computing and various factors may have affected negatively to improve students IT skills. Then, 494 students out of 714 (i.e. 69%) were able to pass this proficiency Test. However, detail analysis of student's performance shows some critical issues in the IT Proficiency of students in these study programs.

To some extent, it indicates students have the basic knowledge and skill required to use a computer and basic applications (Word and Excel) but most of them are lacking the professional knowledge of using a computer together with word processing and spreadsheet tools. Professional level knowledge and skills (defined on or above 70 marks) is very important when students seek job opportunities after completing their studies. According to grades analysis although the majority of students have passed in this test, only less than 10% is capable to have professional level knowledge and skill required by the Job market. At the same time, 7 out of 27 study programs failed to achieve the minimum requirement of overall performance (i.e. 40 pass mark).

All study programs were regrouped according to 6 subject streams defined in this report. In general Arts and Medicine was below our expected minimum proficiency requirement and all other streams also were below 60% and hence did not demonstrate good IT skills. On other hand, all subject streams were poor with respect to spreadsheet skills and they were below the cut off mark of 40%. To demonstrate acceptable level of IT Proficiency we expect at least minimum level (40 marks) with respect to all three tests.

Universities are grouped according to levels defined in the IRQUE project for the analysis of data set. With respect to “A” or “B” grades, private institutes have performed better than other levels of state universities. Level 3 universities (North and East universities) had the highest failure rate as well as highest rate of higher grades compared to other universities. In order to improve the relevance and quality of IT proficiency, still more attention is required for state universities than private institutes.

In this report, we also analyzed whether there was any effect on the funding period to enhance the IT proficiency level. The analysis didn’t support the assumption of a longer period of financial support would help to improve IT proficiency.

Analysis indicated that the IT Proficiency levels differ with respect to study programs, study streams, and university levels. The skill level is below the knowledge level but the attention is required to enhance both the knowledge and skill of IT Proficiency in order to make these undergraduates more employable and productive knowledge workers in the future.

## 7. Appendices

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### Appendix 1: Examination Structure

#### Information Technology Proficiency Test for Computer Users

University of Colombo School of Computing (UCSC) is conducting IT Proficiency Test for selected students from IRQUE funded programs. Students who successfully complete this test, will receive a certificate from UCSC. The syllabus is attached to this document and the examination structure which consists of two parts is described below.

Program coordinators are kindly requested to send the full list of students who are willing to take this examination to UCSC (Dr. K. P. Hewagamage, [kph@ucsc.cmb.ac.lk](mailto:kph@ucsc.cmb.ac.lk)) as soon as possible and the examination date and schedule will be informed shortly. It is necessary to have a lab with 50 computers with Internet connection to conduct this examination. For more details, please contact Dr. K. P. Hewagamage.

Thank you very much for your cooperation.

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#### Examination Structure

##### **Part 1: Online e-Test**

Objective: To assess the knowledge of fundamentals of ICT and knowledge required to work with a computer.

Duration: 2hrs

No. of Questions: 40 MCQs (Randomly selected)

Syllabus: Sections 1,2, 5 and 6 (please refer the attached syllabus)

##### **Part 2: Practical Test**

Duration: 2 hrs. No. of Practical: 2

(1). **Word Processing Test** (based on the Section 3) – one hour practical test based on Microsoft Word 2003.

A student is required to compose word processing document using Microsoft Word 2003 based on the instructions given within one hour. Student has to upload his/her answer to an online system for marking.

(2). **Spreadsheet Management Test** (based on the Section 4)– one hour practical test based on the Microsoft Excel 2003

A student is required to compose spreadsheet file using Microsoft Excel 2003 complete according to given instructions within the specified period time. Student has to upload his/her answer to an online system for marking.

## Appendix 2: Syllabus for IT Proficiency Test

### UCSC Computer User License (UCUL)

#### INTRODUCTION

This course provides basic Information and Communication Technology (ICT) knowledge and skills required to use a computer effectively and efficiently.

#### LEARNING OUTCOMES

After successfully completing this course, student will be able to:

- Describe the basic terminology used in personal computing
- Define the basic concepts of Information and Communication Technology (ICT)
- Carry out basic operations in the desktop environment of Windows.
- Prepare a document using a word processing package
- Prepare a data sheet using a spreadsheet package
- Describe facilities to prepare a presentation using a presentation package
- Search for information using a browser on the Internet
- Communicate through Internet using common tools

#### Assessment Criteria

There will be 2 hrs. online e-Test and 2 hrs. practical test based on Microsoft Word 2003 and Microsoft Excel 2003.

Test will be carried out using the Virtual Learning Environment for Foundation of Information Technology (FIT). <http://fit.bit.lk/lms>

#### OUTLINE OF SYLLABUS

Topic	Average hours*
1. Fundamentals of ICT	24
2. Working with a Computer	30
3. Word Processing	42
4. Spreadsheet Management	42
5. Electronic Presentation	21
6. Internet and Communication	21
<b>Total</b>	<b>180</b>

\* Depending on student capability, this could vary

#### RECOMMENDED MATERIAL

##### Main Reading:

**Ref1:** Introduction to Computers (6<sup>th</sup> Edition) by Peter Norton, Tata McGraw-Hill Edition, ISBN 0-07-059374-4

**Ref2:** Microsoft Office 2003: The Complete Reference, Jennifer Ackerman Kettell, Guy Hart-Davis, Curt Simmons, Tata McGraw-Hill Edition 2003. ISBN 0-07-058299-8

## DETAILED SYLLABUS

### 1. Fundamentals of Information and Communication Technology (ICT) (24 hrs)

#### Instructional Objectives:

- Describe what ICT is
- List the factors affecting the performance of a computer
- Describe input, output and storage devices
- Compare and contrast System Software and Application Software
- Explain what a computer system is as well as its parts
- Describe a computer network
- Describe the terms Internet, Intranet and Extranet
- Describe the usage of ICT in different sectors
- Explain health problems due to usage of computers
- Explain how to protect your information system
- Explain privacy issues and security policies

#### 1.1 Basic Concepts

- 1.1.1 Introduction to ICT
- 1.1.2 Different types of computers (PC, Workstation, Laptop, PDA) [Ref1.: Pg 5-10]
- 1.1.3 Main parts of a computer system [Ref1.: Pg 25-39]
- 1.1.4 Components inside the casing/system unit
- 1.1.5 Factors affecting the performance of a computer [Ref1.: Pg 133-140]

#### 1.2 Hardware

- 1.2.1 Input devices [Ref1.: Pg 30-31, 68-78]
- 1.2.2 Output devices [Ref1.: Pg 30-31, 87-97, 108-117]
- 1.2.3 Storage devices [Ref1.: Pg 31-32]
- 1.2.4 Processing devices [Ref1.: Pg 128-133]

#### 1.3 Software [Ref1.: Pg. 32-34, 204-205, 226-229]

- 1.3.1 System software [Ref1.: Pg 32-34]
- 1.3.2 Introduction to PC operating systems [Ref1.: Pg 205-211, 226-229]
- 1.3.3 Application software [Ref1.: Pg 32-34]

#### 1.4 Computer Networks

- 1.4.1 Local Area Network (LAN) [Ref1.: Pg 248]
- 1.4.2 Wide Area Network (WAN) [Ref1.: Pg 248]
- 1.4.3 Metropolitan Area Network (MAN) [Ref1.: Pg 249]
- 1.4.4 Internet [Ref1.: Pg 286-292]
- 1.4.5 Intranet and Extranet [Ref1.: Pg 351-352]

#### 1.5 Usage of ICT [Ref1.: Pg. 11-19]

- 1.5.1 Computers at work [Ref1.: Pg 11-19]
- 1.5.2 ICT usage in different sectors (e-commerce, e-banking, e-medicine)



## 1.6 Health, safety and environment

1.6.1 Computer based good working environment [Ref1.: Pg 60-64 ]

1.6.2 Computer related health problems

1.6.3 Protecting environment

## 1.7 Information security

1.7.1 Computer threats -Software (Viruses, Worms, Hackers) [Ref1.: Pg 478-483, 532-536]

1.7.2 Threats to hardware [Ref1.: Pg 484-488]

1.7.3 Privacy issues [Ref1.: Pg 499-508]

## 1.8 Legal regulations

1.8.1 Copyright and related laws

1.8.2 Data protection laws in Sri Lanka

## 2. Working with the computer (Windows) (30 hrs)

### **Instructional Objectives:**

- Describe how to work with the desktop in Windows
- Describe the terms: keyboard, mouse and volume
- Describe desktop components
- List the basic task of an operating system
- Explain how to set the regional settings
- Introduce different storing methods
- Explain basic functions of managing data
- Introduce file and folder handling techniques

### 2.1 Working with the desktop Windows

### 2.2 Setting the environment of a computer

2.2.1 Display

2.2.2 Desktop component (Graphical User Interfaces)

2.2.3 Keyboard

2.2.4 Mouse

2.2.5 Volume

2.2.6 Language, date, time and region

2.2.7 Desktop windows

### 2.3 Storing and managing data

2.2.1 Drives

2.2.2 Folders and files

2.2.3 Basic functions (Create, Copy, Move, Paste)

### 2.4 Files and folder handling techniques

2.2.1 Text editors

2.2.2 Restoring

2.2.3 Searching

2.2.4 Compressing and uncompressing

### 3. Word processing (42 hrs)

#### **Instructional Objectives:**

- List different word processing applications
- List the main features of commonly used word processing applications
- Format document for accepted professional standards
- Apply Mail-Merge Wizard to create personalized documents
- Apply security settings

#### 3.1 Introduction [Ref2.: Pg. 3-4]

3.1.1 What is word processing?

3.1.2 List different word processing applications

#### 3.2 Getting started with Microsoft Word [Ref2.: Pg. 105-119]

3.2.1 How to start MS Word

3.2.2 The MS Word interface

3.2.3 Using help

#### 3.3 Creating your first document [Ref2.: Pg. 43-44]

3.3.1 Starting a document

3.3.2 Saving a document

3.3.3 Closing documents

3.3.4 Opening documents

3.3.5 Working with multiple documents

#### 3.4 Adjusting environment settings [Ref2.: Pg. 106-108, 119,

3.4.1 Page views

3.4.2 Zoom tool

3.4.3 Displaying/hiding built-in toolbars

3.4.4 Viewing/hiding non printing characters

#### 3.5 Entering text and symbols [Ref2.: Pg. 135-136]

3.5.1 Insert/overtyping mode

3.5.2 Inserting symbols and special characters

#### 3.6 Editing text [Ref2.: Pg. 67-72, 125]

3.6.1 Selection techniques

3.6.2 Cut/copy/paste

3.6.3 Finding and replacing

#### 3.7 Formatting text [Ref2.: Pg. 131-134]

3.7.1 Applying different attributes

3.7.2 Drop cap

3.7.3 Change case

### 3.8 Formatting paragraphs [Ref2.: Pg. 137-143, 145-151, 192-194]

- 3.8.1 Setting up paragraphs
- 3.8.2 Bullets and numbering
- 3.8.3 Column settings

### 3.9 Working with tables [Ref2.: Pg. 181-192]

- 3.9.1 Inserting tables
- 3.9.2 Modifying table structure
- 3.9.3 Table properties
- 3.9.4 Using formulas

### 3.10 Working with graphics and charts [Ref2.: Pg. 77-95]

- 3.10.1 Drawing canvas
- 3.10.2 Basic shapes
- 3.10.3 Word art
- 3.10.4 Diagram and organization charts
- 3.10.5 Clip Art
- 3.10.6 Inserting pictures

### 3.11 Setting up pages [Ref2.: Pg. 153-160]

- 3.11.1 Adding page numbers
- 3.11.2 Headers and footers
- 3.11.3 Adding page breaks/section breaks

### 3.12 Printing documents [Ref2.: Pg. 122-123]

- 3.12.1 Print preview
- 3.12.2 Printing documents

### 3.13 Using mail merge [Ref2.: Pg. 237-247]

### 3.14 Introduction to Document templates [Ref2.: Pg. 170-173]

- 3.14.1 What is a document template?
- 3.14.2 Using a template

## 4. Spreadsheet Management (42 hrs)

#### **Instructional Objectives:**

- List different spreadsheet management applications
- List the main features of commonly used spreadsheet management application packages
- Use different functions in spreadsheet applications
- Analyze and interpret data using MS Excel

### 4.1 Introduction [Ref2.: Pg. 3, 6]

- 4.1.1 What is spreadsheet management?
- 4.1.2 List different spreadsheet management applications

- 4.2 Getting started with MS Excel [Ref2.: Pg. 258-267]
  - 4.2.1 How to start Excel
  - 4.2.2 Excel interface
  - 4.2.3 Excel terminology
  - 4.2.4 Moving the cell pointer
  - 4.2.5 Entering data
- 4.3 Basic file operations [Ref2.: Pg. 257]
  - 4.3.1 Saving a workbook
  - 4.3.2 Opening/closing workbook
- 4.4 Environment settings [Ref2.: Pg. 252-257]
  - 4.4.1 Option settings
  - 4.4.2 Display/hide toolbars
  - 4.4.3 Splitting and freezing panes
- 4.5 Working with cells [Ref2.: Pg. 279-289]
  - 4.5.1 Selecting a cell/cells
  - 4.5.2 Entering different types of data into cells
  - 4.5.3 Entering formulas/functions into cells
- 4.6 Formatting cells and worksheets [Ref2.: Pg. 289-293]
  - 4.6.1 Formatting cell/cells
  - 4.6.2 Conditional formatting
  - 4.6.3 Adjusting row height/column width
  - 4.6.4 Applying colors, patterns and borders
  - 4.6.5 Inserting/deleting rows/columns
- 4.7 Working with functions [Ref2.: Pg. 305-312, 315-318,323]
  - 4.7.1 Using different types of functions
  - 4.7.2 Using different cell references
- 4.8 Formatting/modifying charts [Ref2.: Pg. 331-344]
  - 4.8.1 Creating charts
  - 4.8.2 Formatting/modifying charts
- 4.9 Setting up pages [Ref2.: Pg. 272-275]
  - 4.9.1 Page setup
  - 4.9.2 Adding title rows/columns and headers/footers
- 4.10 Printing worksheets and charts [Ref2.: Pg. 270-271]
  - 4.10.1 Setting/clearing the print area
  - 4.10.2 Previewing the worksheet
  - 4.10.3 Modifying the worksheet settings

## 5. Electronic Presentation (21 hrs)

### Instructional objectives:

- Describe what a presentation is
- List different presentation application packages
- List main features of commonly used presentation application packages
- Design presentations using AutoContent Wizard
- Design presentations from scratch
- Practice the different settings in presentations

### 5.1 Introduction [Ref2.: Pg 6]

- 5.1.1 What is a presentation?
- 5.1.2 List different presentation application packages

### 5.2 Getting started with MS PowerPoint [Ref2.: Pg 377-387]

- 5.2.1 How to start MS PowerPoint
- 5.2.2 PowerPoint interface
- 5.2.3 Creating a new presentation using AutoContent Wizard
- 5.2.4 Creating a new presentation using the Blank Presentation
- 5.2.5 Viewing the presentation

### 5.3 Modifying presentations [Ref2.: Pg 389-392]

- 5.3.1 Adding / deleting slides
- 5.3.2 Changing the order of slides
- 5.3.3 Hiding the slides
- 5.3.4 Working in slide sorter view

### 5.4 Formatting presentations [Ref2.: Pg 392-394]

- 5.4.1 Formatting fonts and paragraphs
- 5.4.2 Working with bulleted and numbered lists
- 5.4.3 Formatting backgrounds
- 5.4.4 Working with design templates
- 5.4.5 Using the slide master

### 5.5 Working with drawings, graphics and charts [Ref2.: Pg 407-427]

- 5.5.1 Adding/modifying drawing objects
- 5.5.2 Inserting/formatting images
- 5.5.3 Creating/modifying graphs/charts

### 5.6 Delivering the presentations [Ref2.: Pg 429-439]

- 5.6.1 Slide transitions
- 5.6.2 Animation schemes
- 5.6.3 Custom animations

- 5.6.4 Rehearsing slide show
- 5.6.5 Creating custom shows
- 5.6.6 Packaging for CD
- 5.6.7 Saving as a web page
- 5.7 Working with multimedia [Ref2.: Pg 427]
  - 5.7.1 Inserting sounds/video clips
  - 5.7.2 Adding narrations
- 5.8 Printing [Ref2.: Pg 439]
  - 5.8.1 Setting the printing options
  - 5.8.2 Previewing

## 6. Internet and Communication (21 hrs)



### Instructional Objectives:

- Define what Internet is
- List facilities/benefits of Internet
- Describe the ways to connect to Internet
- Use a web browser to surf the Internet
- Use search engines to find information on the Internet
- Create/use an e-mail account
- Describe the security and risks involved in Internet
- Describe the concept of eCommerce
- Discuss the future of Internet

- 6.1 Introduction [Ref1.: Pg 285-290]
  - 6.1.1 What is Internet?
  - 6.1.2 The history of Internet
  - 6.1.3 Differences between Internet and World Wide Web
  - 6.1.4 Introducing the Internet buzz words
- 6.2 Identifying facilities/benefits of Internet [Ref1.: Pg 295-297]
- 6.3 Connecting to Internet [Ref1.: Pg 331-339]
  - 6.3.1 Describing the different connecting methods
  - 6.3.2 List the advantages and disadvantages of connecting methods
- 6.4 Web Browsers [Ref1.: Pg 295-299]
  - 6.4.1 Introducing different web browsers
  - 6.4.2 Interfaces of Web Browsers
  - 6.4.3 Setting up browser's home page
  - 6.4.5 Saving the contents opened from the web browser
  - 6.4.6 Downloading different contents from the Internet

- 6.5 Search Engines [Ref1.: Pg 301-306]
  - 6.5.1 Introducing different search engines
  - 6.5.2 Finding information using search engines
- 6.6 e-mail [Ref1.: Pg 312-315]
  - 6.5.1 Describe different e-mailing methods
  - 6.5.2 List e-mail client software
  - 6.5.3 Creating a free e-mail account
  - 6.5.4 Sending/receiving e-mails
  - 6.5.5 Sending/receiving attachments
- 6.7 Security and risk in Internet [[Ref1.: Chapter 13]
  - 6.7.1 Security settings in web browsers/e-mail client software
  - 6.7.2 Taking the precautions when using the Internet
- 6.8 e-Commerce [Ref1.: Pg 345-355]
  - 6.8.1 What is e-Commerce?
  - 6.8.2 Common e-Commerce web sites
- 6.9 e-Learning
  - 6.9.1 What is e-Learning?
  - 6.9.2 Advantages of e-Learning
- 6.10 Future of Internet

## Appendix 3: Sample Certificate of UCUL



This is to certify that

.....

has successfully passed all test requirements  
for the granting of the

**UCSC Computer User License**

Date:

Certificate No: .....

<http://www.ucsc.cmb.ac.lk/elc/ucul>

Director

**UCSC Computer User License (UCUL) Program**

**Outline of Syllabus\***

**Fundamentals of ICT**  
Basic Concepts, Hardware, Software, Computer Networks, Usage of ICT, Health, safety and environment, Information security and Legal regulations

**Working with a Computer**  
Working with the desktop Windows, Setting the environment of a computer, Storing and managing data and Files and folder handling techniques.

**Word Processing**  
Introduction, Getting started with Microsoft Word, Creating your first document, Adjusting environment settings, Entering text and symbols, Editing text, Formatting text, Formatting paragraphs, Working with tables, Working with graphics and charts, Setting up pages, Printing documents, Using mail merge and Introduction to Document templates

**Electronic Presentation**  
Introduction, Getting started with MS PowerPoint, Modifying presentations, Formatting presentations, Working with drawings, graphics and charts, Delivering the presentations, Working with multimedia and Printing

**Internet and Communication**  
Introduction, Identifying facilities/benefits of Internet, Connecting to Internet, Web Browsers, Search Engines, e-mail, Security and risk in Internet, e-Commerce, e-Learning and Future of Internet

**Spreadsheet Management**  
Introduction, Getting started with MS Excel, Basic file operations, Environment settings, Working with cells, Formatting cells and worksheets, Working with functions, Formatting/modifying charts, Setting up pages and Printing worksheets and charts

\*This Evaluation was carried out using Microsoft® Windows and Microsoft® Office tools

**Examination Structure**

Part 1 : Online e-Test: Duration: 2hrs

Part 2 : Practical Test Duration: 2hrs



## Appendix 4: Sample test papers used for Practical Assessments

Part I : Word Processing Practical Test  
Prepare this document (2 pages), using MS-Word and Save using your  
Registration Number.

### Renaming Documents

To rename a Word document while using the program, select File → Open and find the file you want to rename. Right-click on the document name with the mouse and select **Rename** from the shortcut menu. Type the new name for the file and press the **ENTER** key.

Common types of application software are:

- ☛ Word Processing
  - ☞ MS-Word, WordPerfect ...
- ☛ Spreadsheet
  - ☞ Ms-Excel, LOTUS 1-2-3 ...
- ☛ Database Management System
  - ☞ MS-Access, Paradox, ORACLE ...
- ☛ Presentation Software
  - ☞ MS-PowerPoint, Corel Presentation ...

### Explain cut, copy, and paste.

The *Cut*, *Copy*, and *Paste* commands are nearly universal. These three functions are used by almost every Windows program and perform more or less the same function in each of them.

**Cut:** When you cut something, it is deleted from its current location and saved to the Clipboard.

**Copy:** Copy is similar to Cut except the original item is not deleted.

**Paste:** You can place information on the Clipboard wherever you like. Execute the Paste command and information you have cut or copied is placed wherever your cursor is located.

Pictures help us to understand the thing easily.



Symbols can give good emotional feelings than text messages. Few good symbols are:



## Mark sheet

Student's Reg. No.	Year I		Year 2		Total
	Semester I	Semester II	Semester I	Semester II	

### Interpreting descriptive statistics

#### SD and CV

**Standard deviation (SD)** quantifies variability. If the data follow a bell shaped Gaussian distribution, then 68% of the values lie within one SD of the mean (on either side) and 95% of the values lie within two SD of the mean. The SD is expressed in the same units as your data. Prism calculates the SD using the equation below. (Each  $y_i$  is a value,  $y_{mean}$  is the average, and  $N$  is sample size).

$$SD = \sqrt{\frac{\sum (Y_i - Y_{mean})^2}{N - 1}}$$

The standard deviation computed this way (with a denominator of  $N-1$ ) is called the *sample SD*, in contrast to the *population SD*

which would have a denominator of  $N$ . Why is the denominator  $N-1$  rather than  $N$ ? In the numerator, you compute the difference between each value and the mean of those values. You don't know the true mean of the population; all you know is the mean of your sample. Except for the rare cases where the sample mean happens to equal the population mean, the data will be closer to the sample mean than it will be to the population mean. This means that the numerator will be too small. So the denominator is reduced as well. It is reduced to  $N-1$  because that is the number of *degrees of freedom* in your data. There are  $N-1$  degrees of freedom, because you could calculate the remaining value from  $N-1$  of the values and the sample mean.

#### 95% Confidence interval

The confidence interval quantifies the precision of the mean. The mean you calculate from your sample of data points depends on which values you happened to sample.

## ASCII

In computer one of the famous coding schemes is the ASCII coding Scheme. This scheme uses  $2^8$  (256) different patterns.

## Drawing in Word

We can make free hand drawings in Word.



Part 2: Spreadsheet Practical Test

A. Consider the Worksheet Structure given below.

Pure Debt Collecting Systems Debt Collection Commission Summary Report 2008							
No	Initials	Sur Name	Payment Due Date	Payment Collected Date	Received Amount	Commission	% to the Total Commission
1	A.C.D.	Silva	January 15, 2008	February 15, 2008	25,900.00	?	?
2	D.D.	Withanage	February 20, 2008	May 30, 2008	32,500.00	?	?
3	K.S.	Mahagodage	February 10, 2008	May 11, 2008	78,452.00	?	?
4	T.G.	Withanage	March 25, 2008	April 14, 2008	29,582.00	?	?
5	L.B.	Mendis	May 20, 2008	June 24, 2008	25,784.00	?	?
6	K.K.	Peris	March 27, 2008	April 28, 2008	1,784.00	?	?
7	B.B.	Rathnayake	May 15, 2008	May 30, 2008	258,795.00	?	?
8	K.C.	Silva	October 20, 2008	January 27, 2009	25,841.00	?	?
9	D.K.	Silva	February 1, 2008	March 17, 2008	412,588.00	?	?
10	C.F.	Peris	May 5, 2008	May 17, 2008	412,588.00	?	?
Total					?	?	?
Maximum					?	?	?
Minimum					?	?	?
Number of Sales Reps who earned Rs. 5000+ or more as their commission					?		

B.

- (i) Prepare the above worksheet by completing the cells marked with ? (question mark) using relevant formula. Name the worksheet as "Data".

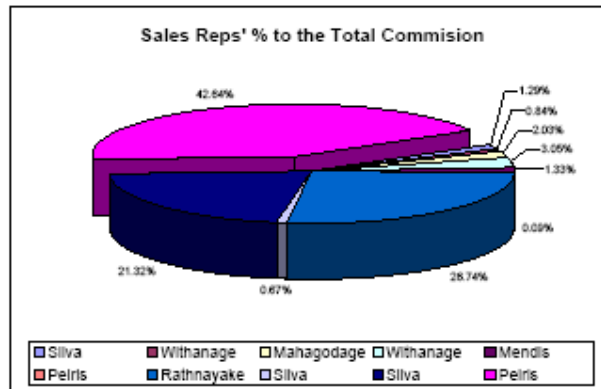
Note:

Commission is calculated by considering the number of days taken to collect the payments from the due date.

Days taken to collect	Commission %
with in 30 days	20
with in 31-60 days	10
more than 90 days	5

- (ii) Format the "Received Amount", "Commission" columns to Rs. Currency symbol with two decimal places.

- (iii) Draw the following Pie Chart using the worksheet data



- (iv) Copy the worksheet contents in to a new worksheet and then sort all records according to the "Sur Name" of the Sales Representative. Name the worksheet as "Report".

- (v) In the "Report" worksheet, filter the records where the payment is collected after 30th April 2008 into a new area in the worksheet.

Save your worksheet file using your Registration Number

ExcelEval-SouthEastern.xls

## Appendix 5: SPSS Generated outputs related to analysis and findings

**Table 5.A: Descriptive Statistics of Tests for Each Study Program**

Program		N	Mean	Std. Deviation
APIIT	Etest	43	65.9381	19.36446
	Word	43	49.8837	18.12189
	Excel	43	28.4186	15.83732
	Average	43	56.0820	15.26016
EU-AGR	Etest	19	55.5358	8.97350
	Word	19	47.8421	18.99200
	Excel	19	16.2632	12.05470
	Average	19	47.4057	8.93670
ICASL	Etest	19	57.1711	10.63297
	Word	19	53.2368	17.76495
	Excel	19	53.0526	19.41784
	Average	19	55.5679	10.72924
JFU-MED	Etest	53	39.9788	13.85744
	Word	53	38.9623	18.06395
	Excel	53	16.2264	17.09436
	Average	53	35.9344	12.99914
JFU-PHY	Etest	48	61.3208	20.39546
	Word	48	79.1146	20.86870
	Excel	48	49.0625	30.22357
	Average	48	63.6300	17.00195
KLN-BIO	Etest	13	56.8915	12.43224
	Word	13	48.4615	13.40625
	Excel	13	37.3077	17.75005
	Average	13	51.7349	11.43881
KLN-BMGT	Etest	30	54.7640	11.55507
	Word	30	51.0000	17.63617
	Excel	30	44.3333	23.40547
	Average	30	52.1917	11.27190
KLN-COM	Etest	50	54.1416	12.09836
	Word	50	42.1300	16.78672
	Excel	50	29.5000	17.82139
	Average	50	47.3162	10.61193
MRT-CE	Etest	39	58.5415	15.61185
	Word	39	58.3333	17.41458
	Excel	39	24.3590	14.19690
	Average	39	53.0224	13.01768
MRT-ER	Etest	41	58.5410	11.56548
	Word	41	45.0610	17.46861
	Excel	41	23.2927	18.39191
	Average	41	49.6660	11.78182
MRT-ME	Etest	44	67.3668	11.31078
	Word	44	60.4432	18.47727
	Excel	44	18.3864	16.55184
	Average	44	57.8683	10.10978
PDN-AGR	Etest	3	23.1933	9.66015
	Word	3	35.0000	13.22876
	Excel	3	5.0000	.00000
	Average	3	23.1160	8.95988
PDN-SCI	Etest	14	57.7993	10.42631
	Word	14	41.9643	19.78681
	Excel	14	12.1429	8.48399
	Average	14	46.6939	9.46945
PDN-VET	Etest	17	61.7759	10.29662
	Word	17	48.0882	20.20461
	Excel	17	28.8235	19.16454
	Average	17	53.2185	8.49693
RHU-ECO	Etest	15	33.5667	17.34818
	Word	15	43.1667	21.51550
	Excel	15	18.0000	13.73213
	Average	15	33.3800	15.27950
RHU-MED	Etest	12	46.6842	18.94726
	Word	12	34.5833	24.06982
	Excel	12	8.3333	6.15457
	Average	12	37.6438	17.28126
RU-ASCI	Etest	14	47.7664	18.49776
	Word	14	45.0000	23.59514
	Excel	14	27.8571	24.39375
	Average	14	43.9170	17.56916
SEU-LAN	Etest	8	38.1263	10.82390
	Word	8	27.5000	25.17794
	Excel	8	8.7500	7.44024
	Average	8	30.8758	12.40517
SEU-SSCI	Etest	29	44.9710	11.24199
	Word	29	24.7414	12.45250
	Excel	29	11.2069	8.30825
	Average	29	34.7137	8.72866
SJP-ACC	Etest	34	51.9788	11.27225
	Word	34	36.9118	21.12426
	Excel	34	32.9412	24.37453
	Average	34	45.3167	12.08990
SJP-MED	Etest	47	52.1726	11.91938
	Word	47	35.0851	20.54986
	Excel	47	12.2979	11.35000
	Average	47	41.6916	11.65002
SU-AGR	Etest	39	48.2321	14.06828
	Word	39	52.8205	17.93794
	Excel	39	19.1026	15.25536
	Average	39	44.6726	12.45095
SU-ASCI	Etest	26	62.6604	12.08682
	Word	26	40.7692	18.71856
	Excel	26	19.2308	17.24484
	Average	26	50.4578	11.43856
UoC-MED	Etest	38	49.9184	12.00897
	Word	38	30.3947	24.24903
	Excel	38	7.1053	6.11064
	Average	38	38.3826	11.88991
WU-FSCI	Etest	19	57.4442	11.16425
	Word	19	53.2895	16.00895
	Excel	19	35.5263	18.62605
	Average	19	52.9402	11.01323

**Table 5.B: E-Test Grades for each Study program**

			Grades for E-Test				Total
			A	B	C	F	
Institute	APIIT	Count	20	19	1	3	43
		%	46.5%	44.2%	2.3%	7.0%	100.0%
	EU-AGR	Count	1	7	11	0	19
		%	5.3%	36.8%	57.9%	.0%	100.0%
	ICASL	Count	3	8	8	0	19
		%	15.8%	42.1%	42.1%	.0%	100.0%
	JFU-MED	Count	0	8	20	25	53
		%	.0%	15.1%	37.7%	47.2%	100.0%
	JFU-PHY	Count	17	22	5	4	48
		%	35.4%	45.8%	10.4%	8.3%	100.0%
	KLN-BIO	Count	3	3	7	0	13
		%	23.1%	23.1%	53.8%	.0%	100.0%
	KLN-BMGT	Count	3	10	15	2	30
		%	10.0%	33.3%	50.0%	6.7%	100.0%
	KLN-COM	Count	8	14	24	4	50
		%	16.0%	28.0%	48.0%	8.0%	100.0%
	MRT-CE	Count	7	20	8	4	39
		%	17.9%	51.3%	20.5%	10.3%	100.0%
	MRT-ER	Count	5	24	10	2	41
		%	12.2%	58.5%	24.4%	4.9%	100.0%
	MRT-ME	Count	16	22	5	1	44
		%	36.4%	50.0%	11.4%	2.3%	100.0%
	PDN-AGR	Count	0	0	0	3	3
		%	.0%	.0%	.0%	100.0%	100.0%
	PDN-SCI	Count	2	7	5	0	14
		%	14.3%	50.0%	35.7%	.0%	100.0%
	PDN-VET	Count	3	9	5	0	17
		%	17.6%	52.9%	29.4%	.0%	100.0%
	RHU-ECO	Count	0	1	6	8	15
		%	.0%	6.7%	40.0%	53.3%	100.0%
	RHU-MED	Count	2	1	5	4	12
		%	16.7%	8.3%	41.7%	33.3%	100.0%
	RU-ASCI	Count	1	4	7	2	14
		%	7.1%	28.6%	50.0%	14.3%	100.0%
	SEU-LAN	Count	0	0	4	4	8
		%	.0%	.0%	50.0%	50.0%	100.0%
	SEU-SSCI	Count	0	6	14	9	29
		%	.0%	20.7%	48.3%	31.0%	100.0%
	SJP-ACC	Count	1	14	14	5	34
		%	2.9%	41.2%	41.2%	14.7%	100.0%
	SJP-MED	Count	4	11	27	5	47
		%	8.5%	23.4%	57.4%	10.6%	100.0%
	SU-AGR	Count	1	16	11	11	39
		%	2.6%	41.0%	28.2%	28.2%	100.0%
	SU-ASCI	Count	10	10	6	0	26
		%	38.5%	38.5%	23.1%	.0%	100.0%
	UoC-MED	Count	0	16	15	7	38
		%	.0%	42.1%	39.5%	18.4%	100.0%
	WU-FSCI	Count	4	5	10	0	19
		%	21.1%	26.3%	52.6%	.0%	100.0%
Total	Count	111	257	243	103	714	
	%	15.5%	36.0%	34.0%	14.4%	100.0%	

**Table 5.C: Grades for the Word Test for each Study program**

			Grades for Word				Total
			A	B	C	F	
Institute	APIIT	Count	6	12	12	13	43
		%	14.0%	27.9%	27.9%	30.2%	100.0%
	EU-AGR	Count	1	8	2	8	19
		%	5.3%	42.1%	10.5%	42.1%	100.0%
	ICASL	Count	2	7	5	5	19
		%	10.5%	36.8%	26.3%	26.3%	100.0%
	JFU-MED	Count	2	8	13	30	53
		%	3.8%	15.1%	24.5%	56.6%	100.0%
	JFU-PHY	Count	38	7	0	3	48
		%	79.2%	14.6%	.0%	6.3%	100.0%
	KLN-BIO	Count	0	4	7	2	13
		%	.0%	30.8%	53.8%	15.4%	100.0%
	KLN-BMGT	Count	2	9	15	4	30
		%	6.7%	30.0%	50.0%	13.3%	100.0%
	KLN-COM	Count	2	8	16	24	50
		%	4.0%	16.0%	32.0%	48.0%	100.0%
	MRT-CE	Count	10	12	10	7	39
		%	25.6%	30.8%	25.6%	17.9%	100.0%
	MRT-ER	Count	5	5	17	14	41
		%	12.2%	12.2%	41.5%	34.1%	100.0%
	MRT-ME	Count	15	11	12	6	44
		%	34.1%	25.0%	27.3%	13.6%	100.0%
	PDN-AGR	Count	0	0	2	1	3
		%	.0%	.0%	66.7%	33.3%	100.0%
	PDN-SCI	Count	2	1	4	7	14
		%	14.3%	7.1%	28.6%	50.0%	100.0%
	PDN-VET	Count	2	5	5	5	17
		%	11.8%	29.4%	29.4%	29.4%	100.0%
	RHU-ECO	Count	1	2	5	7	15
		%	6.7%	13.3%	33.3%	46.7%	100.0%
RHU-MED	Count	1	2	3	6	12	
	%	8.3%	16.7%	25.0%	50.0%	100.0%	
RU-ASCI	Count	2	2	3	7	14	
	%	14.3%	14.3%	21.4%	50.0%	100.0%	
SEU-LAN	Count	1	0	1	6	8	
	%	12.5%	.0%	12.5%	75.0%	100.0%	
SEU-SSCI	Count	0	1	3	25	29	
	%	.0%	3.4%	10.3%	86.2%	100.0%	
SJP-ACC	Count	1	7	7	19	34	
	%	2.9%	20.6%	20.6%	55.9%	100.0%	
SJP-MED	Count	2	7	8	30	47	
	%	4.3%	14.9%	17.0%	63.8%	100.0%	
SU-AGR	Count	5	15	12	7	39	
	%	12.8%	38.5%	30.8%	17.9%	100.0%	
SU-ASCI	Count	1	5	7	13	26	
	%	3.8%	19.2%	26.9%	50.0%	100.0%	
UoC-MED	Count	5	2	2	29	38	
	%	13.2%	5.3%	5.3%	76.3%	100.0%	
WU-FSCI	Count	2	6	6	5	19	
	%	10.5%	31.6%	31.6%	26.3%	100.0%	
Total	Count	108	146	177	283	714	
	%	15.1%	20.4%	24.8%	39.6%	100.0%	

**Table 5.D: Excel Grades for each Study program**

			Grades for Excel				Total
			A	B	C	F	
Institute	APIIT	Count	0	2	9	32	43
		%	.0%	4.7%	20.9%	74.4%	100.0%
	EU-AGR	Count	0	0	1	18	19
		%	.0%	.0%	5.3%	94.7%	100.0%
	ICASL	Count	1	9	4	5	19
		%	5.3%	47.4%	21.1%	26.3%	100.0%
	JFU-MED	Count	0	3	2	48	53
		%	.0%	5.7%	3.8%	90.6%	100.0%
	JFU-PHY	Count	10	13	8	17	48
		%	20.8%	27.1%	16.7%	35.4%	100.0%
	KLN-BIO	Count	0	2	4	7	13
		%	.0%	15.4%	30.8%	53.8%	100.0%
	KLN-BMGT	Count	3	8	6	13	30
		%	10.0%	26.7%	20.0%	43.3%	100.0%
	KLN-COM	Count	2	2	11	35	50
		%	4.0%	4.0%	22.0%	70.0%	100.0%
	MRT-CE	Count	0	1	5	33	39
		%	.0%	2.6%	12.8%	84.6%	100.0%
	MRT-ER	Count	0	3	4	34	41
		%	.0%	7.3%	9.8%	82.9%	100.0%
	MRT-ME	Count	0	2	4	38	44
		%	.0%	4.5%	9.1%	86.4%	100.0%
	PDN-AGR	Count	0	0	0	3	3
		%	.0%	.0%	.0%	100.0%	100.0%
	PDN-SCI	Count	0	0	0	14	14
		%	.0%	.0%	.0%	100.0%	100.0%
	PDN-VET	Count	0	0	8	9	17
		%	.0%	.0%	47.1%	52.9%	100.0%
	RHU-ECO	Count	0	0	1	14	15
		%	.0%	.0%	6.7%	93.3%	100.0%
RHU-MED	Count	0	0	0	12	12	
	%	.0%	.0%	.0%	100.0%	100.0%	
RU-ASCI	Count	1	1	3	9	14	
	%	7.1%	7.1%	21.4%	64.3%	100.0%	
SEU-LAN	Count	0	0	0	8	8	
	%	.0%	.0%	.0%	100.0%	100.0%	
SEU-SSCI	Count	0	0	1	28	29	
	%	.0%	.0%	3.4%	96.6%	100.0%	
SJP-ACC	Count	2	6	5	21	34	
	%	5.9%	17.6%	14.7%	61.8%	100.0%	
SJP-MED	Count	0	0	1	46	47	
	%	.0%	.0%	2.1%	97.9%	100.0%	
SU-AGR	Count	0	1	4	34	39	
	%	.0%	2.6%	10.3%	87.2%	100.0%	
SU-ASCI	Count	0	1	4	21	26	
	%	.0%	3.8%	15.4%	80.8%	100.0%	
UoC-MED	Count	0	0	0	38	38	
	%	.0%	.0%	.0%	100.0%	100.0%	
WU-FSCI	Count	0	3	6	10	19	
	%	.0%	15.8%	31.6%	52.6%	100.0%	
Total	Count	19	57	91	547	714	
	%	2.7%	8.0%	12.7%	76.6%	100.0%	

**Table 5.E: Overall Grades for each Study program**

			Overall Grade				Total
			A	B	C	F	
Institute	APIIT	Count	5	26	9	3	43
		%	11.6%	60.5%	20.9%	7.0%	100.0%
	EU-AGR	Count	0	4	11	4	19
		%	.0%	21.1%	57.9%	21.1%	100.0%
	ICASL	Count	1	11	6	1	19
		%	5.3%	57.9%	31.6%	5.3%	100.0%
	JFU-MED	Count	0	5	18	30	53
		%	.0%	9.4%	34.0%	56.6%	100.0%
	JFU-PHY	Count	18	22	4	4	48
		%	37.5%	45.8%	8.3%	8.3%	100.0%
	KLN-BIO	Count	0	6	5	2	13
		%	.0%	46.2%	38.5%	15.4%	100.0%
	KLN-BMGT	Count	2	11	13	4	30
		%	6.7%	36.7%	43.3%	13.3%	100.0%
	KLN-COM	Count	1	10	29	10	50
		%	2.0%	20.0%	58.0%	20.0%	100.0%
	MRT-CE	Count	4	15	14	6	39
		%	10.3%	38.5%	35.9%	15.4%	100.0%
	MRT-ER	Count	0	15	19	7	41
		%	.0%	36.6%	46.3%	17.1%	100.0%
	MRT-ME	Count	5	18	20	1	44
		%	11.4%	40.9%	45.5%	2.3%	100.0%
	PDN-AGR	Count	0	0	0	3	3
		%	.0%	.0%	.0%	100.0%	100.0%
	PDN-SCI	Count	0	3	8	3	14
		%	.0%	21.4%	57.1%	21.4%	100.0%
	PDN-VET	Count	0	7	10	0	17
		%	.0%	41.2%	58.8%	.0%	100.0%
	RHU-ECO	Count	0	0	6	9	15
		%	.0%	.0%	40.0%	60.0%	100.0%
	RHU-MED	Count	0	2	4	6	12
		%	.0%	16.7%	33.3%	50.0%	100.0%
	RU-ASCI	Count	1	3	6	4	14
		%	7.1%	21.4%	42.9%	28.6%	100.0%
	SEU-LAN	Count	0	0	1	7	8
		%	.0%	.0%	12.5%	87.5%	100.0%
	SEU-SSCI	Count	0	0	9	20	29
		%	.0%	.0%	31.0%	69.0%	100.0%
	SJP-ACC	Count	0	9	13	12	34
		%	.0%	26.5%	38.2%	35.3%	100.0%
	SJP-MED	Count	0	9	15	23	47
		%	.0%	19.1%	31.9%	48.9%	100.0%
	SU-AGR	Count	0	11	17	11	39
		%	.0%	28.2%	43.6%	28.2%	100.0%
	SU-ASCI	Count	0	10	12	4	26
		%	.0%	38.5%	46.2%	15.4%	100.0%
	UoC-MED	Count	0	4	16	18	38
		%	.0%	10.5%	42.1%	47.4%	100.0%
	WU-FSCI	Count	1	5	13	0	19
		%	5.3%	26.3%	68.4%	.0%	100.0%
Total		Count	38	206	278	192	714
		%	5.3%	28.9%	38.9%	26.9%	100.0%



**Table 5.F: Tests and grades****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	698.970 <sup>a</sup>	6	.000
Likelihood Ratio	716.027	6	.000
N of Valid Cases	2142		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 56.00.

**Table 5.G: Streams and grades****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	179.424 <sup>a</sup>	15	.000
Likelihood Ratio	191.585	15	.000
N of Valid Cases	714		

a. 3 cells (12.5%) have expected count less than 5. The minimum expected count is 2.29.

**Table 5.H: University Level and grades****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	81.876 <sup>a</sup>	9	.000
Likelihood Ratio	79.377	9	.000
N of Valid Cases	714		

a. 1 cells (6.3%) have expected count less than 5. The minimum expected count is 3.30.

**Table 5.J: Batch and grade****Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.900 <sup>a</sup>	3	.000
Likelihood Ratio	41.782	3	.000
N of Valid Cases	714		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.97.